

# Egg Shape Characterization for Four Genetic Groups of Kurdish Local Chickens

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**Abstract:** - Egg external traits have attentions from researchers for many years ago. This study was conducted to compare between the egg shapes of four genetic groups of Kurdish local chicken. 454 Eggs from all the groups were individually weighed to the nearest 0.01 g using an electronic digital balance. Length and width of egg were individually recorded by using a digital caliper. It was found significant difference ( $P < 0.01$ ) between White with shank feather and Black with brawn neck in egg weight. Egg length also differs significantly between black brawn neck, white with shank feather and white without shank feather ( $P < 0.01$ ). Egg breadth was significantly just between pure black and weight without shank feather. And finally shape index was differing significantly between groups but just pure black and white without shank feather not differ in ( $P < 0.01$ ) level. The highest significant positive correlations between external egg traits were found between egg weight and egg breadth (0.796), and between egg weight and egg length (0.760)  $p < 0.0001$ . Higher significant negative correlation was between egg length and egg shape index (-0.813)  $p < 0.0001$ . It could be concluded that there were statistically significant differences between the genetic groups in their egg weight and egg external traits such as egg length, egg breadth and shape index, and this may be due to their genetic makeup. Further studies are needed to characterize these groups based on molecular markers.

**Key-words:** Local Chicken, External Egg Traits, Breadth

## 1. Introduction:

Egg external traits have attentions from researchers for many years ago, since the Egg shape influence by genetic selection [5], and environment [12, 17]. It's indicator for a good hatchability [3,6,12,14], hen age [1] also the opportunity to establish new commercial lines for egg production [16], and to make differentiation between the breeds or genetic lines [10,11,13], in addition to that many researcher trying to estimate the sex of chicks before hatching from the external parameters for the fertilized egg[7]. As early as 2004 many attempts were made in Agricultural Research Centre-Erbil to study the characterize of Kurdish local chicken that collected from the villages of Kurdistan, followed by selection for Egg production and resistance to disease traits on some crosses. Four groups were established

(Pure black, Black with brawn neck, White with shank feather and White without shank feather) based on their feather phenotype appearances. Much research was done to evaluate the physiological and productive traits [2, 8, 9]. Up to date there is no research about the external properties of egg for Kurdish local chicken. The main objective of this study was to characteristic the external egg parameters (egg length, egg breadth, egg weight and Egg shape index)of the Kurdish local chicken.

## 2. Materials and Methods:

The present study was carried out in November, 2013 in the poultry production division, Agricultural Research centre in Sulaimani, Ministry of Agriculture and water Recourses in Kurdistan within latitude ( $35^{\circ} 32$

30) north and longitude (45° 21 00) east at of (737.5 M) above sea level. A total of four genetic groups of chicken, which were given names as (Pure black, Black with brawn neck, White with shank feather and White without shank feather). Chickens were managed under a semi-open system. The poultry house dimension (3.5 m X 7 m), with all the equipment. Clean drinking water was provided to roosters and hens at all times and chickens received 110 g/d of a diet. Records were used to obtain the averages of some Kurdish local groups of chickens on the following traits: egg length, egg breadth, egg weight and egg shape index. Four hundred and fifty four Fresh eggs were obtained from four genetic groups flocks at 40 - 60 weeks of age [15, 18].

Egg Weight was taken on individual eggs from each layer by an electronic balance having sensitively of 0.01g. A Venire caliper with accuracy of 0.01mm was used to determine the egg length. It was taken as the longitudinal distance between the narrow and the broad ends. Breadth it was measured to the nearest 0.01mm with venire caliper. The egg Breadth was taken as the diameter of the widest cross-sectioned region of egg was individually recorded by using a digital caliper. Shape index was calculated by following equation (Breadth/High \* 100) [19].

General linear model (GLM) within SAS Program [21] was used to investigate the effect of genetic lines. Duncan (1955) Multiple Range Test was used to test the differences between means of the traits studied. Also correlation coefficients between the studied traits were estimated.

### 3. Result and discussion:

Over all mean, Mean, standard error and F-value of external traits of egg are shown in Table 1. According to results of General Linear Model analyses, the external traits of egg vary between the four genetic groups. The mean egg weight was highest in White with shank feather (60.05 ± 0.67gm.) intermediate in White without shank feather and Pure black (60.02 ± 0.52 gm.), (58.98 ± 0.40 gm) respectively, and lowest in Black with brawn neck (58.26 ± 0.40

gm.)(Table1, Fig1-a).There is a significant difference (P<0.01) between White with shank feather and Black with brawn neck. This result supports the findings of [4, 20] which reported there is a relationship between feather colors with the weight of the eggs in geese and chicken.

Mean of egg length in White with shank feather (Table 1, Fig 1-b) was also higher (59.02 ± 0.32 mm), while intermediate in White without shank feather (57.18 ± 0.28 mm) and lowest in Black with brawn neck (55.92 ± 0.23 mm).The Pure black intermediate between the White with shank feather and white without shank feather and not differ significantly (P<0.01) with them.

Mean of egg breadth in White without shank feather was (43.31 ± 0.14 mm) while intermediate in Black with brawn neck and White with shank feather (43.17 ± 0.09 mm, 43.11 ± 0.28 mm) respectively, and lowest in pure black (42.68 ± 0.11 mm). There was significant difference between White without shank feather and Pure black (P<0.01), and there were no significant differences between Black with brawn neck and White with shank feather with both pure black and White without shank feather.

Mean of shape index in black with brawn neck was highest among all the genetic groups (77.37 ± 0.27), intermediate in white without shank feather (75.95 ± 0.33) and lowest in Pure black and white with shank feather (73.52 ± 0.29), (73.12 ± 0.66) respectively. Statistically there were significant differences between genetic groups except pure black with white with shank feather (Table 1).

Table (2) shows the phenotypic correlation among the external egg traits in the four genetic groups of the Kurdish local chicken. The highest significant positive correlations between external egg traits were found between egg weight and egg breadth (0.796), and between egg weight and egg length(0.760) p< 0.0001. Higher significant negative correlation between egg length and egg shape index (-0.813) p< 0.0001.

### 4 Conclusion

It could be concluded that there were statistically significant differences between the genetic groups in their egg weight and egg external traits such as egg length, egg breadth and shape index, and this may be due to their genetic makeup. Further studies are needed to characterize these groups based on molecular markers.

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Table 1: Means  $\pm$  Standard Errors for the traits Studied

Parameter	No.	Egg Weight (gm)	Egg Length (mm)	Egg Breadth (mm)	Shape Index (%)
Over all mean	454	59.16 $\pm$ 0.26	57.01 $\pm$ 0.14	43.12 $\pm$ 0.07	75.82 $\pm$ 0.19
Pure Black	91	58.98 $\pm$ 0.40 <sup>ab</sup>	58.11 $\pm$ 0.23 <sup>ab</sup>	42.68 $\pm$ 0.11 <sup>b</sup>	73.52 $\pm$ 0.29 <sup>c</sup>
Black with brawn neck	169	58.26 $\pm$ 0.40 <sup>b</sup>	55.92 $\pm$ 0.23 <sup>c</sup>	43.17 $\pm$ 0.09 <sup>ab</sup>	77.37 $\pm$ 0.27 <sup>a</sup>
White with shank feather	28	60.05 $\pm$ 0.67 <sup>a</sup>	59.02 $\pm$ 0.32 <sup>a</sup>	43.11 $\pm$ 0.28 <sup>ab</sup>	73.12 $\pm$ 0.66 <sup>c</sup>
White without shank feather	166	60.02 $\pm$ 0.52 <sup>ab</sup>	57.18 $\pm$ 0.28 <sup>b</sup>	43.31 $\pm$ 0.14 <sup>a</sup>	75.95 $\pm$ 0.33 <sup>b</sup>
F-Value		3.09	15.68	3.86	26.39

Means with different superscript in the same column differs significantly ( $P < 0.01$ )

Table 2: Phenotypic Correction between External egg quality traits

	Egg length	Egg breadth	Shape index
Egg weight	0.760	0.796	-0.297
Egg length		0.358	-0.813
Egg breadth			0.249

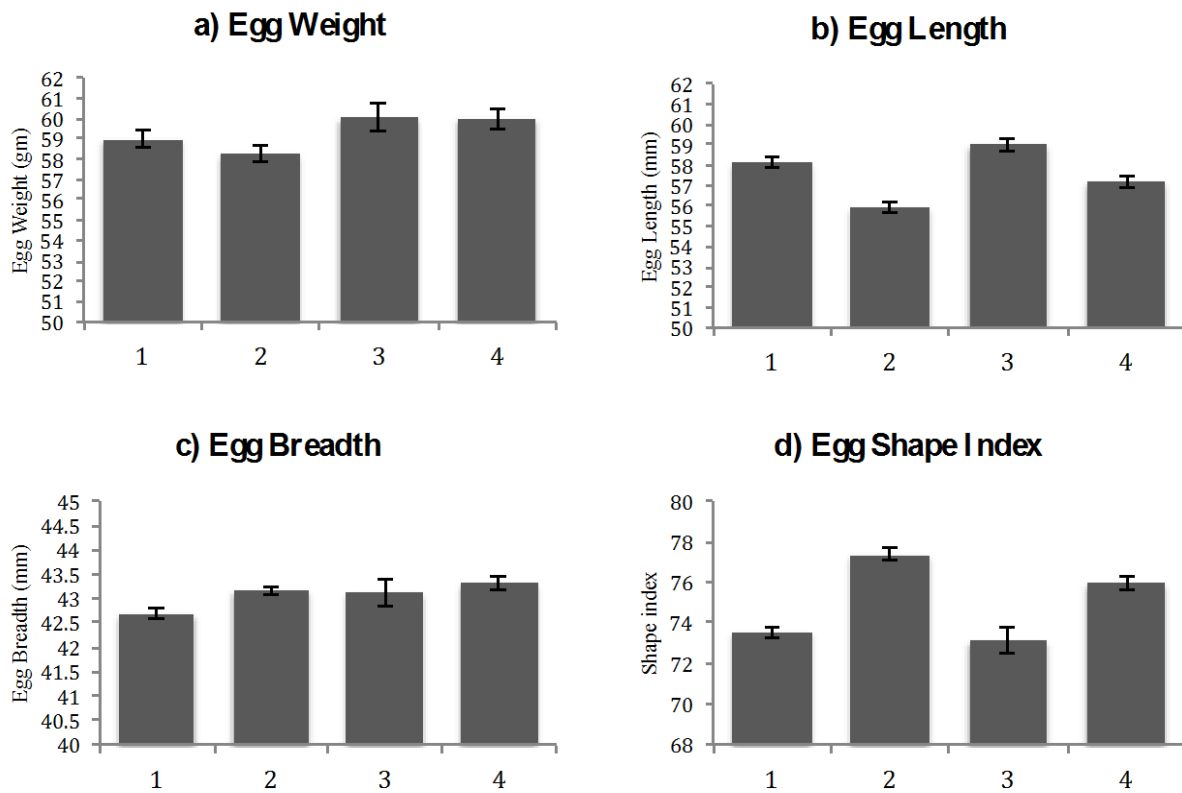


Figure 1: The means of the external egg traits for the four genetic groups. a) egg weight, b) egg length, c) egg breadth, d) egg shape index. 1= pure black; 2= black with brawny neck; 3= white with shank feather; 4= white without shank feather.