

ISSN 1682-8356  
ansinet.org/ijps



INTERNATIONAL JOURNAL OF  
**POULTRY SCIENCE**

**ANSI***net*

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## Comparison of the Egg Characteristics of Different Sudanese Indigenous Chicken Types

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**Abstract:** Three local types of Sudanese indigenous fowls, large Baladi (LB), Bare-neck (BN) and Betwil (BT) were studied for detection of maturity live weight and egg characteristics. The (BN) average live weight (1547.2±274.5 gm) was heavier than either (LB) (1494.4±349.8 gm) or (BT) (1198.3±257.5 gm), The Betwil average live weight is significantly ( $P<0.05$ ) lighter than those of other two local types. The weekly hen-day egg production means were 3.7, 3.2 and 3.9 for (BN), (BT) and (LB) respectively, while the corresponding hen-housed egg production means were 3.3, 2.7 and 3.4. The rate of egg production during the laying period (36 weeks) was 47.14, 38.57 and 48.57 for (BN), (BT) and (LB) respectively. There were significant differences ( $P<0.05$ ) in average egg-shell thickness among local types. The means of egg-shell thickness for (BT) and (BN), 36.2±4.2 and 36.2±4.0 $\mu$  respectively were similar and both significantly thicker than that of (LB), 34.3±3.6 $\mu$

**Key words:** Egg production, Sudanese indigenous, chicken types

### Introduction

Sudanese fowls with their various types, which are collectively called Baladi, were early described by Desai, 1962. These birds commonly known as large Baladi, Bare-neck and Betwil. The traditional system of small home flock and backyard scavengers are based on these native types with their low unit cost that confers considerable advantage on their equitable distribution across wide range of socio-economic activities. The indigenous fowl is less prolific compared with exotic breeds. Desai *et al.* (1961) reported 106, 68 and 86 egg per bird per year for Bare-neck, large Baladi and Betwil respectively. While egg size that measured as egg weight is smaller, resulting in low mass output (g/bird/day). The main factor that contributes to shell quality and strength is shell thickness because it affects market value through resistance to cracking and for its effect on hatchability. Many genetic and non-genetic factors affected egg-shell thickness, in particularly, breed effect and feed quality. Arad and Malder (1982) found a significant differences ( $P<0.05$ ) in egg-shell thickness between Sinai indigenous breed (37.0±38.5 $\mu$ ) and Leghorn (31.3 $\mu$ ).

### Materials and Methods

The indigenous types were collected from the Nuba Mountains, south Kordofan State by purchasing ninety pullets of each type. Eighty pullets of each type were

assigned, weighted, leg banded and randomly distributed in cages of single-deck batteries individually. The parent stock was kept for adaptation period of four weeks, during which they were vaccinated against New castle and Fowl pox diseases, they were also treated against ectoparasite and received multivitamins, antibiotics and piprazine prophylactic doses. Lighting programme was 14 hrs. Light and the flock were fed commercial layer ration *ad libitum*. Eggs were collected twice a day, given the specific dam number. Individual egg weight was determined on daily basis and micrometer measurement was practiced to determine egg-shell thickness including shell membrane. Means of shell thickness were obtained from broad, middle and narrow sides. The traits measured during the study period that extended to 36 weeks included egg production, egg weight and egg-shell thickness in addition to initial dams weight. The data was subjected to analysis of variance (Snedecor, 1956).

### Results and Discussion

The initial dams live weight is depicted in Table 1, the Bare-neck average live weight (154.7± 274.3 gram) was higher than either large Baladi (1494.4± 349.8g) or Betwil (1198.3 ± 257.5g), Decuypere *et al.* (1993) stated that at high mean ambient temperature, homozygous or heterozygous necked-neck birds were heavier than normal birds. The superiority of Bare-neck average live

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weight compared with other local dams is also reported by those of Berea and Howliger (1990). The Betwil average live weight is significantly ( $P<0.05$ ) lighter than those of other two local types. The result is in agreement with those of Bullerman (1982) and Merat (1990) studies, who reported that the dwarf "dw" gene reduced body weight by 30 and 33 percent respectively, compared with normal chickens. The relatively high (s.d) may be due to small samples, on the other hand, the high coefficient of variability estimated for local types average body weights could be due to genetical and phenotypical variations within those types.

Table 1: Means, standard deviation (s.d) and coefficient of variation (c.v) for local dams live weight (gm)

Type(s)	Mean ± SD	C.V. (%)
Large Baladi	1494.4±349.8 (80)	23.40
Bare-neck	1547.2±274.3 (80)	17.72
Betwil	1198.3±257.5 (80)	21.48

The weekly hen-day egg production means were 3.7, 3.2 and 3.9 for Bare-neck, Betwil and large Baladi respectively, while the corresponding hen-housed egg production means were 3.3, 2.7 and 3.4. There were no significant differences in egg production within local types. The rate of egg production during the laying period was 47.14, 38.57 and 48.57 percent for BN, BT and LB respectively. The low production capacity of Betwil type could be due to sex-linked dwarfing gene, which found to have a negative effect on laying performance of the affected hens (Bullerman, 1982).

Table 2: Mean, standard deviation and coefficient of variation for egg weight of local types (gm)

Type(s)	Mean ± SD	C.V.
Large Baladi	38.46±2.86	7.43
Bare-neck	39.89±3.94	10.36
Betwil	37.95±4.42	11.62

Table 2 shows the average egg weight per dam type. Although there were no significant differences in egg size among the three types, egg weight of Bare-neck and large Baladi were both slightly heavier than that of the Betwil. Desai (1962), Wilson (1985) reported close results for Sudan indigenous egg weight and Pandey *et al.* (1989) for Aseel fowl. However, Yousif (1987) and Sulieman (1996) obtained higher average egg weight (42.2 and 40.6g) respectively, for Sudan large Baladi. Egg weight is largely affected by environmental factors, food restriction (Shaler and Pasternak, 1993) and parental average body weight; the differences could be attributed to these factors, moreover, evidence of genetic involvement including breed effect could be observed.

Table 3: The average egg-shell thickness, standard deviation (s.d) and coefficient of variation (c.v) (micron) Large Baladi

Type(s)	(Mean±SD) $\mu$	C.V
Large Baladi	34.32±3.68	10.72
Bare-neck	36.21±4.08	11.26
Betwil	36.21±4.22	11.65

Table 4: Analysis of variance (ANOVA) for average egg-shell thickness among dam types

S.O.V	df	SS	MS
Total	159	2645.892	
Between dam	2	109.274	54.637*
Error	157	2536.626	16.156

Shell quality, particularly shell thickness, is an important trait that primarily breeders of egg laying flock incorporate into their breeding programmes to reduce egg-shell breakage. Table 3 and 4 represent the average egg-shell thickness and their analysis of variance. There were significant differences ( $P<0.05$ ) in average egg-shell thickness among local types. The average egg-shell thickness of Betwil ( $36.2 \pm 4.2\mu$ ) and of Bare-neck ( $36.2 \pm 4.0\mu$ ) were similar and both were significantly thicker than that of large Baladi ( $34.3 \pm 3.6 \mu$ ) according to Jitendra *et al.* (1971), it seemed that there is a negative correlation between shell thickness and laying rate, the differences may be due to this negative correlation.

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