Evaluation of Egg Quality Traits of the Sudanese Large Belladi Fowl

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SUMMARY

Data set composed of 446 eggs laid by the first generation of 120 large Belladi pullets. The foundation stock was randomly purchased from Central Sudan (Managil) in accordance with the features described by Desai (1962). The mean and standard deviations of egg weight, albumen height, shell thickness and Haugh unit were 36.39±4.27 g, 8.53±1.9 mm 3.68±0.97 mmμ and 99.02±44.9 respectively. The phenotypic correlation between egg weight and shell thickness was found to be 0.233 and the correlation between albumen height and Haugh unit was found to be 0.143, they were both highly significant at P = 0.001.

INTRODUCTION

The native fowl of Sudan is found in rural areas and villages alongside river banks, and they are mainly reared by women and children. The native chickens are well adapted to the range management. They are left to search for their own food while given only additional small amount of grains early in the morning. For protection they are also provided with night shelter. Thus the whole process is not expensive and need little effort but the profit is minimum. The chickens originally found in Sudan are called Belladi, meaning native, which include three main types, large Belladi, Bare neck and Betwil. The Large Balladi type is the most widely distributed (Desai 1962). It is characterized by variable color and body size and moderate egg size ranging from 42.2 – 31.9 gm (Yousif 1987 and Elhag 1998).

One of the economically important phenomenon in Large Belladi is broodiness, as it causes tremendous decrease in the annual egg production. Desai (1962) reported that egg / year, while Yousif and Osman (1994) reported 47% production under relatively improved husbandry. Egg quality traits are very important since they affect egg breakage, consumer preference, storing ability and hatchability. Thus such traits should have special consideration in any breeding program. These traits are intended to be studied in this trial.

MATERIALS AND METHODS

For the experiment, 446 eggs were randomly chosen and studied at a rate of 50 eggs / day. The flock from which the eggs were taken was composed of 200 pullets kept in deep litter houses at Kuku Central Poultry Farm. The mean high and low temperatures during the experimental period, which extended from August to April was 34.21°C and 21.0 °C. The experimental diet given was a balanced layer ration. The eggs were weighted individually then broken and dropped gently in a Petri dish where the albumen highest is measured using a transparent plastic ruler and the presence of blood spots and meat particles was noticed. The yolk colour was graded from 1-6 using California Yolk fan. Then the shells were cleaned, left for a day to dry, and then using a micrometer measured their thickness.

Statistical and Analytical Analysis:

Haugh unit for each egg was obtained using the formula described by Neshiem *et al*., (1979).

Haugh unit = $100 \log (H + 7.57 - 1.7 W^{0.37})$.

Where:

H = Albumen height.

W = Egg weight.

The data were statistically analysed by SPSS software to obtain the means, standard deviations and the phenotypic correlations of the various traits studied.

The coefficient of variation for each trait was calculated using the following equation:

C.V. = (S.D x 100) ÷ mean.

RESULTS AND DISCUSSIONS

Table 1 shows the mean S.D. and coefficient of the traits studied. The mean egg weight was 36.39±4.57 g., which is in accordance with the result obtained by Kuit (1986), for Somalian local fowl but less than the results obtained by Yousif (1987) and Sulieman (1996) for the same Large Belladi. Egg shell thickness in this experiment is found to be 0.368±0.97 micron which agreed with the result reported by Osman (1999) for the Bovan strain of the Leghorn breed (0.38). This result is slightly higher than the result reported by Ahmed (2003) for large Belladi but slightly lower than the result obtained by Alsobayel (1998) for the egg of the Saudi Arabia Belladi fowl. For albumen the mean height was found to be 8.35±1.91 mm which agreed with the result (8.41) reported by Saad (2001). Haugh unit and was found to be 99.01% ± 44.91%. This result agreed with the range (90-100%) reported by Neishem *et al*., (1968) for eggs of albumen height ranging from 7.6 to 10.3. However this result is higher than the result reported by Ahmed (2003) for the Belladi type.

The coefficient of variations for the traits studied is high to moderate indicating a solid background for genetic improvement by selection.

Table 1. Mean, Standard deviation and coefficient of variation of egg
weight, albumen height, shell thickness and Haugh unit.

Trait	Mean	S.D.	C.V (%)
Egg weight	36.39 g	4.27	11.73
Albumen height	8.35 mm	1.91	27.87
Shell thickness	3.68 mic.	0.97	26.35
Haugh unit	99.02 %	44.91	45.35

Source: Author's experiment.

The results also revealed that the incidence of blood spots was only 5.6%, which agreed with the percentage reported by Kumar and Acharya (1980) in their study for the Indian Belladi fowl (5.96%). While the incidence of meat in this trial was zero percent, Kumar and Acharya (1980) reported 11.01% for the same trait in the Indian fowl.

Table 2 shows the various phenotypic correlations among the traits studied phenotypic correlation between egg weight and albumen height in this study is 0.084 which is slightly lower than the result depicted by Koke *et al.*, (2004) for guinea fowl (0.23). The phenotypic correlation between shell thickness and egg weight (0.148), is highly significant (P<0.01) which agreed with the result reported by Mohanty (1986), Herbert (2004) reported negative results. The phenotypic correlation between albumen height and shell thickness is -0.24, which agreed directionally but differ quantitatively from the result reported by Koke (2004) (-0.32). The phenotypic correlation of Haugh unit for egg weight and albumen height was both significantly positive. Silversides (1994) found high correlation between Haugh unit and albumen height.

Table 2. The phenotypic correlations between the student traits.

Trait	Egg weight	Albumen height
Egg weight	1.0	1.0
Albumen height	-0.84	1.0
Shell thickness	0.148	-0.240
Haugh unit	0.69	0.233

Source: Author's experiment.

The results also depicted a mean colour grade of 3.52±1.95 which is comparable with the result reported by Shawkat (2002). Consumers preferred mostly the eggs with high yolk colour intensity Prabakaran *et al.*, (2001), however Smith (1996) reported that the colour of the yolk is influenced to a large degree by nutrition. Therefore dark yellow yolk can be produced by feeding laying hens on grass meal.

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تقدير بعض خصائص البيض لنوعية الدجاج البلدي الكبير السوداني

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ملخص البحث:

أجريت هذه الدراسة علي 446 بيضة انتجت من الجيل الأول الذي تكون من 120 دجاجة من نوع البلدي الكبير تم شراؤه من مدينة المناقل – وسط السودان حسب مواصفات ديساي (1962) .

تم تقدير المتوسطات والانحرافات القياسية لوزن البيض ، ارتفاع البياض ، سمك القشرة ووحدة هاو . وكانت النتائج كما يلي بالترتيب mm, μ 0.97±3.68 , % 44.9±99.02 , g 4.27±36.39 19±8.53

أما معاملات الارتباط المظهرية بين وزن البيض وكل من سمك القشرة وارتفاع البياض فقد كانت معنوية .