Egypt Poult. Sci. Vol (25) (I): (195-208)

# RESULTS OF RANDOM SAMPLE TEST FOR LAYING PERFORMANCE OF NINE EGYPTIAN STRAINS OF CHICKENS

**By**

**Ensaf, A. El Full*, H. M. Abd El Wahed, M. M. Namra, A.M. R. Osman and N. A. Hataba**

Anim. Prod. Res. Inst., El Dokki, Giza, Egypt.

* Poult. Prod. Dept., Fac. of Agric., Fayoum, Cairo Univ., Egypt.

Received: 20/12/2004 Accepted: 21/02/2005

**Abstract:** *Nine Egyptian varieties or strains of chickens evaluated for egg performance, feed efficiency of egg production, crude protein and caloric efficiency ratio, body weight at sexual maturity, fertility and hatchability percentages. During the whole testing period, all birds received the same feed and water and kept under the same environmental conditions.*

**The following results were obtained:**

1. *Matrouh and Inshas reached sexual maturity five or six days significantly earlier (P≤0.01) than the others. Sinai chickens had the heaviest body weight at sexual maturity.*
2. *The results of rate of lay were in favor of Salam and Dandarawi during the three periods of test and the whole period. Dams of Salam, Golden Montazah, Mandarah and Matrouh can be selected to improve rate of lay in the first 90days of production or/and egg mass. It could be noticed that the tested strains followed different production curves. Therefore, it is recommended in future to test the productivity for longer period than 12 weeks.*
3. *Estimates of feed efficiency, crude protein efficiency and caloric efficiency ratio were in favor of Salam and Golden Montazah, Mandarah and Matrouh that produced the heaviest eggs.*
4. *Dandarawi and Fayoumi had higher shape index and thicker shells than all developed strains. Fayoumi and Matrouh showed significantly higher scores for yolk color than other strains.*
5. *Fayoumi had significantly (P≤0.01) higher yolk to albumen percent than other strains and the eggs from Fayoumi may be more useful in products made of yolk than for use as table eggs.*

6. *Developed strains tested: Golden Montazah, Anshas, Salam and Mandarah had superior Haugh unit scores than other native strains.*
7. *Fayoumi had significantly higher (P≤0.01) fertility % than all studied strains. Significant differences in hatchability (P≤0.01) were observed among the indegenous breeds due to the variation in late embryonic mortality, which may reflect the presence of some lethal genes in those flocks with higher rate of late mortality***.**

## INTRODUCTION

Statistics showed that Egypt'self-sufficiency cannot be achieved, where per capita egg consumption levels are low but are increasing (FAO, 2003), although Egyptian breeds of chickens had regained their dominance over the imported ones after poultry production crises in the years following 1986 due to complete dependence on imported foreign commercial breeds.

Some people argue that in developing countries which have the infrastructure for massive growth of the chicken industry, a faster rate of genetic progress could be made through multiplication of imported stock and their distribution to farms having intensive, semi-intensive or even extensive (small- holder) systems of management (Mukherjee, 1993). Conversely, Barker (1982) argued that there are large phenotypic and possibly genetic variations existing within the indigenous breeds and varieties. Therefore, the application of genetical studies toward improving these stocks should be undertaken through proper evaluation and documentation of these breeds, and a suitable selection procedure has to be devised to provide an optimum genotype to the farmers. Most of conservationists support this proposal because rich and well conserved natural resources give a developing country great opportunity to sustain economic growth and development, and give its people a strong feeling of self reliance, sense of pride, and identity (Arboleda, 1987).

Establishing new gene reservoirs for producing an Egyptian's commercial egg-type breed of chicken has become a must, through crossing coupled with selection due to actual initial performance of foundation stocks utilized for producing egg-type Egyptian commercial breeds of chickens (Mahmoud, 2000). To continue the improvement of the laying hen, further changes will need to be made. Accurate and reliable measurements of the characteristics involved in egg quality (Bornstein *et al.*, 1982) and the correlated traits contributed to the reproductive fitness which included: rate of lay %, fertility %, age at first egg and egg weight (Decuypere *et al*.,2003)

are prerequisite for its improvement by research and its evaluation for marketing purposes.

More than ten new varieties or strains of chickens were developed in Egypt through crossing local and foreign strains such as Dokki-4 (El Itriby and Sayed, 1966), Golden Montazah (Mahmoud *et al*., 1974a), Matrouh (Mahmoud *et al*., 1974b), Silver Montazah (Mahmoud *et al*., 1974c), Mamourah (Abdel Gawad *et al*.,1980), Gimmizah (Mahmoud *et al*.,1982), and Inshas (Bakir *et al*., 2002 ). Since these local varieties are expected to be more adapted to the unfavorable local conditions, they could be utilized in the process of establishing a local hybrid for egg production (Saleh *et al*., 1994 and Mahmoud, 2000). Therefore, the evaluation or at least monitoring these local varieties or strains under the same conditions is highly needed, before starting such a breeding program to establish an efficient egg type chickens.

The aim of this study is to test and evaluate nine Egyptian varieties or strains of chickens for egg-laying performance and reproductive traits under same conventional conditions.

## MATERIALS AND METHODS

This work was carried out at El Takamoly Poultry Project during the period from July 2001 to November 2002. Ten random samples, each of 100 chicks, for nine Egyptian varieties or strains of chickens: Three indegenous breeds (Dandarawi, Fayoumi and Sinai) and Developed varieties or strains (Bahig, Golden Montazah, Inshas, Mandarah, Matrouh and Salam) were used in this study to test and evaluate their laying performance. The experiment started when first egg of each strain was recorded as age at 5% egg production for each strain (calculated as the number of days until 5% egg production had been reached). During the whole testing period, all birds received the same restricted feed and water adequately supplied (as 105g / bird for Dandarawi, Fayoumi and Sinai and 120g /bird for other developed strains). All birds kept under the same environmental conditions. The proximate analysis of layer diets was determined and shown in Table 1. The minerals and vitamins were adequately supplied to cover the requirements according to the Egyptian Ministerial Decree No. 1498 (1996).

Data were statistically analyzed using a fixed model of one factor (strain) for absolute or transformed data (all variables expressed as percentages were transformed to arc-sine values) according to Steel and Torrie (1980). Data of hatching characteristics were corrected for hatch

effect. Strain means of the studied traits indicating significant differences were tested using Duncan's multiple range test (Duncan, 1955).

**The Following Criteria Were Studied:**

**1. Egg Production-Related Traits:**

Age at first egg was recorded as age at 5% egg production for each strain which calculated as the number of days until 5% egg production had been reached (AFE, days) and body weight at sexual maturity ($BW_{SM}$, g), rate of lay (RL%), egg weight (EW, g) and feed efficiency of egg production (FE, 1 kg egg mass/kg feed) during the first, second and third month of egg production were recorded for each strain during the tested periods.

**2. Egg Quality Traits:**

A total number of 900 eggs was randomly taken from the studied strains or varieties of chickens at the end of the third fourth weeks of egg production and used to evaluate exterior and interior egg quality according to Stino *et al.* (1982). Egg shape index (SI) was estimated as the maximum width to its length. Eggs were individually weighed, then broken and the inner contents were placed on a leveled glass surface to determine yolk and albumen grade. Percentages of yolk, albumen and shell were calculated. Yolk index (YI) was calculated as the ratio of yolk height to its diameter. Haugh unit (HU) scores were calculated according to Haugh (1937). Shell thickness (ST) was measured on the membraneless shells by Ames shell thickness gauge to the nearest mm. Yolk color (YC) scores were determined using Roche fan.

**3. Hatching characteristics:**

A total number of 39150 eggs (about 4350 eggs/strain) was used from the nine native varieties or strains of chickens. Sex ratio used was one male for ten females. Eggs were incubated in the same incubator. Hatchability studies were performed after hens aged nearly 40 weeks, during the period from July, 2001 up to January, 2002. Eight hatches were incubated at weekly interval for each strain. Fertility and hatchability percentages were calculated. Dead embryos from each strain were examined at 7 and 21 days of incubation.

## RESULTS AND DISCUSSION

### 1. Egg Production Traits

Results of egg characteristics for the nine native tested strains are presented in Table 2. Strains such as Matrouh and Inshas reached sexual maturity (139 and 140 days of age) five or six days earlier than some other strains. The latest strains for reaching sexual maturity were Bahig, Golden Montazah, Mandarah and Dandarawi (145, 145, 144 and 144 days of age, respectively). Similar results were observed by Saleh *et al*. (1994). It can be seen that developed strains reached maturity not far from indigenous breeds (142.67 vs 142 days of age, Table 2).

Regarding rate of lay, the results were significantly in favor of Salam, Dandarawi and Golden Montazah pullets during the three periods of test and the whole period. While low rates of lay were recorded for Bahig and Matrouh during the first period (35.9 and 39.15%), Fayoumi and Bahig during the second period (39 and 48.08%). Either Fayoumi and/or Sinai during the third period (40 and 50.54%) and the whole period (42.67 and 47.93%) of production had lower rate of lay than other as shown in Table 2. Lower performance of egg production for Dandarawi was reported by Saleh *et al*. (1994). The differences among reports were mainly due to different environments since no one of the tested strains have been put in a selection program to improve their egg performance. It could be noticed that the tested strains followed different production curves. Therefore, it is recommended in future to test the productivity for longer period than 12 weeks.

Developed strains had heavier $BW_{SM}$ than indigenous breeds (1331 vs 1293g, Table 2). Sinai chickens had the heaviest $BW_{SM}$ while Dandarawi and Matrouh had the lightest weight (1525 vs 1150 and 1190g,$P \leq 0.01$) at sexual maturity.

Information presented in Table 2 indicated that indigenous breeds had lower average of FE than developed strains (0.206 and 0.223). Estimates of FE, CPE and CER were in favor of developed strains, especially Salam, Golden Montazah, Mandarah and Matrouh. This is expected since developed strains laid heavier EM than indigenous breeds (2310 vs 1947g, Table 2). Lower FE values for Dandarawi and Bandarah were reported by Abdel Galil (2004).

## 2. Egg Quality Traits

### 2.1. Exterior Egg Quality

Results presented in Table 3 showed that strain significantly (P≤0.01) affected egg quality traits. Similar trends of significant strain differences in egg quality traits were reported by several investigators (Rasmy, 1984, Ezzeldin and El Labban, 1989 a,b ,Ali *et al*., 1998 and Abdel Latif, 2001).

Sinai and Salam pullets produced the heaviest eggs whereas Mandarah and Dandarawi chickens produced the lightest eggs (P≤0.01, Table 3). The performance of egg weight in the present study is less than those reported by El Dakroury and Mahmoud (1982 and 1983), El Labban (2000) and Abdel Latif (2001). Dandarawi and Fayoumi had higher SI than all developed strains which characterized by lower estimates indicating that developed strains produce eggs that tend to be less elongated compared to local strains. On the contrary, Ezzeldin and El Labban (1989b) reported that local strains produce eggs that tend to be less elongated compared to crossbred strains. It can be seen that indigenous breeds had higher SI% than developed strains (77.09 vs 76.32 %, Table 3).

### 2.2. Interior Egg Quality

It could be seen that Salam had significantly (P≤0.01) higher albumen % than other strains whereas Fayoumi had the lowest albumen % but a higher yolk % as compared to other tested strains. It can be seen that the larger eggs have a greater proportion of albumen, but a lower proportion of yolk which was in agreement with the results of Ezzeldin and El Labban (1989a) and Hussein *et al*. (1993). On the other hand, Cook and Briggs (1977) indicated that as egg size increased the relative amount of yolk decreased. Regarding Y/ Alb %, there were significant strain differences. The eggs from Fayoumi were significantly (P≤0.01) higher in Y/ Alb % than those of other strains which attributable to differences more in the proportion of albumen than in the proportion of yolk. In the present study, it can be concluded that the proportion of yolk and the Y/ Alb % tended to be greater in smaller eggs than in larger eggs, which was in agreement with the results of Cook and Briggs (1977), Ahn *et al*. (1997) and Suk and Park (2001). However, this conclusion disagrees with the results reported by Kaminska and Skaraba (1991). It can be concluded that selection based on egg size would be effective in reducing egg size or Y/ Alb % and the eggs from Fayoumi may be more useful in products made of yolk than for use as table eggs. Regarding shell %, eggs produced from Dandarawi, Golden

Montazah and Mandarah had significantly (P≤0.01, Table 3) higher shell % whereas eggs produced from Sinai cross had the smallest shell %. From Table 3, it is clear that both Fayoumi and Dandarawi had significantly (P≤0.01) thicker shells than other strains. This is expected because these strains had smaller eggs than other strains. Ezzeldin and El Labban (1989b) reported same trend that egg shell of local strains were thicker than in crossbred eggs. On the contrary, Rasmy (1984) reported insignificant breed differences in shell thickness.

Fayoumi, Matrouh and Salam showed significantly (P≤0.01) higher scores for YC than other strains. Eggs produced by Salam, Golden Montazah and Bahig had significantly (P≤0.01) higher YI% than other strains, however eggs produced from Fayoumi had the lowest YI%. Similar trend was reported by El Labban (2000) for this trait.

Results presented in Table 3, indicated that strain significantly (P≤0.01) affected HU scores. Golden Montazah, Inshas, Mandarah and Salam had superior HU scores than other tested strains whereas eggs produced from Matrouh had the lowest HU scores. In general, developed strains tested had higher HU scores than indigenous breeds (90.36 vs 85.06%, Table 3).

It can be concluded that, indigenous breeds had higher yolk %, Y/Alb %, thicker ST and higher color score, than developed strains which means a good merit of the egg quality performance of the native breeds. However, estimates of albumen %, shell %, YI % and HU were in favor of developed strains. Similarly, Ezzeldin and El Labban (1989a) reported that local crossbreeds had higher score for HU than native pure breeds.

### 3. Hatching characteristics

Results of incubation of eggs from the nine native strains of chickens are presented in Table 4. Fertility percentages were over 90% in all strains, which means a good merit of the reproductive performance of these native strains. This advantage of local strains was also observed by Saleh *et al*. (1994). Fayoumi had significantly higher fertility % than all strains whereas Golden Montazah had the lowest fertility % (95.3 vs 90.33, P≤0.01, Table 4). Selected males of Fayoumi could be used as sires to improve reproductive performance of the hybrid. Similarly, significant differences in hatchability (P≤0.01) were observed among the native breeds (Fayoumi, Sinai and Dandarawi) than other developed strains (Golden Montazah, Salam and Inshas). This variation was mainly due to the variation in late embryonic mortality (Dead 21%) as shown in Table 4, which may reflect

the presence of some lethal genes in those flocks with higher rate of late mortality, since eggs of all strains received the same environmental conditions. Similar findings were reported by Saleh *et al*. (1994). Lower estimates for fertility and hatchability were reported by Kosba *et al*. (1981), Abdel Galil (2004) and Kout El Kloub *et al*. (2004) for some local breeds.

Results of laying test of the random samples from nine strains of native chickens concluded that Fayoumi had higher Y/ Alb %, thicker egg shells and superior fertility % than other strains. Since Fayoumi had higher Y/Alb % than other strains, the eggs from Fayoumi may be more useful in products made of yolk than for use as table eggs. However, eggs produced from other tested strains can be selected to improve egg characteristics for table. Regarding rate of egg production, dams of Salam, Dandarawi,Golden Montazah, Matrouh and Mandarah can be selected to improve $RL_{90}$ % or/and egg mass and more attention toward improving egg weight of Dandarawi must be paid .

In conclusion, in spite of the reproductive merit of either local or developed strains or varieties, their productive efficiency still need improvement through applying a consistent and sustainable breeding program. These future studies must test and improve their full record of egg production to clarify the persistency of production for some of these tested strains or varieties. On the other hand, we need to compare among one or more than commercial hybrids with these native or developed strains under same traditional conditions taking into consideration their relative economic efficiency.

## Table (1): Composition and chemical analysis of layer diets.

| Item | Percent |
|---|---|
| Yellow corn, ground | 65.75 |
| Corn gluten (60%) | 2.0 |
| Soybean meal (44%) | 19.0 |
| Wheat bran | 4.1 |
| Limestone | 6.8<br>1.7 |
| Dicalcium phosphate | 1.7 |
| Salt | 0.30<br><br>0.40<br>0.05 |
| Vit-Min. Premix[1] | 0.30<br>0.05 |
| Methionine | 0.05 |
| Total | 100 |
| Calculated analysis | |
| Crude protein % | 16.01 |
| Crude fiber % | 3.31 |
| Ether extract % | 2.82 |
| Lysine % | 0.76 |
| Methionine + Cystine % | 0.61 |
| ME, K cal/Kg | 2755.9 |
| Ca % | 3.02 |
| Available P% | 0.45 |
| Cost/ton, L E (local prices of 2002) | 840.53 |

Vit+Min Permix[1] was added as 3.0Kg / ton of diet and supplied the following (as mg or IU per Kg of diet): vit A 10000 IU, Vit$D_3$1000 IU, Vit E 10mg, Vit $K_3$1mg, Vit $B_1$ 1mg, Vit $B_2$ 4mg, Vit $B_6$ 1.5mg, Pantothenic acid 10mg, Vit $B_{12}$ 0.01mg, Folic acid 1mg, Niacin 20mg, Biotin 0.05mg, Choline chloride 500mg, Zn 45mg, Cu 3mg, Fe 30mg, I 0.3mg, Se 0.1mg, Mn 40 mg, Ethoxyquin 3000mg.*According to NRC (1994).

**Table (2): Results of egg characteristics for nine native strains of chickens.**

| Strain | AFE (days) | $EM_{90}$ (g) | Rate of Lay (RL) $RL_1$ | $RL_2$ | $RL_3$ | $RL_{90}$ (%) | $BW_{SM}$ (g) | FE | CPE | CER |
|---|---|---|---|---|---|---|---|---|---|---|
| Indigenous strains (IS) | | | | | | | | | | |
| Dandarawi | 144$^{c}$ | 2089$^{d}$ | 45.95$^{bc}$ | 62.89$^{a}$ | 66.40$^{b}$ | 58.41$^{b}$ | 1150$^{d}$ | 0.221 | 1.47 | 0.078 |
| Fayoumi | 141$^{ab}$ | 1636$^{bc}$ | 49$^{b}$ | 39$^{e}$ | 40$^{f}$ | 42.67$^{f}$ | 1203$^{c}$ | 0.173 | 1.15 | 0.062 |
| Sinai | 141$^{e}$ | 2115$^{a}$ | 40.59$^{d}$ | 52.66$^{c}$ | 50.54$^{e}$ | 47.93$^{e}$ | 1525$^{a}$ | 0.224 | 1.49 | 0.079 |
| Developed strains (DS) | | | | | | | | | | |
| Bahig | 145$^{a}$ | 2038$^{bc}$ | 35.90$^{e}$ | 48.08$^{d}$ | 59.87$^{c}$ | 47.95$^{e}$ | 1280$^{c}$ | 0.197 | 1.44 | 0.077 |
| Golden Montazah | 145$^{b}$ | 2421$^{bc}$ | 42.56$^{cd}$ | 62.70$^{a}$ | 64.26$^{b}$ | 56.51$^{bc}$ | 1400$^{b}$ | 0.234 | 1.71 | 0.092 |
| Inshas | 140$^{f}$ | 1972$^{bc}$ | 42.67$^{cd}$ | 51.04$^{c}$ | 54.35$^{d}$ | 49.35$^{e}$ | 1275$^{c}$ | 0.191 | 1.39 | 0.074 |
| Mandarah | 144$^{c}$ | 2400$^{c}$ | 45.04$^{c}$ | 55.24$^{b}$ | 56.55$^{d}$ | 52.28$^{d}$ | 1445$^{b}$ | 0.232 | 1.69 | 0.091 |
| Matrouh | 139$^{g}$ | 2345$^{bc}$ | 39.15$^{de}$ | 60.43$^{a}$ | 64.72$^{b}$ | 54.77$^{cd}$ | 1190$^{d}$ | 0.227 | 1.65 | 0.089 |
| Salam | 143$^{d}$ | 2683$^{b}$ | 53.25$^{a}$ | 62.76$^{a}$ | 73.08$^{a}$ | 63.03$^{a}$ | 1395$^{b}$ | 0.259 | 1.89 | 0.101 |
| *Average, IS* | *142* | *1947* | *45.18* | *51.52* | *52.31* | *49.67* | *1293* | *0.206* | *1.37* | *0.073* |
| *Average, DS* | *142.67* | *2310* | *43.09* | *56.71* | *62.14* | *53.98* | *1331* | *0.223* | *1.63* | *0.087* |

AFE: Age at first egg, $EM_{90}$: Egg mass, RL1: Rate of lay during first four weeks of production, 2: Second four weeks of production and 3:
Third four weeks of production and $RL_{90}$: Rate of lay during first 12 weeks of production, $BW_{SM}$: Body weight at sexual maturity, FE: Feed efficiency (1kg egg mass/kg feed), CPE: Crude protein efficiency, CER: Calorie efficiency ratio and IB: Mean of indigenous breeds, DS:
Mean of developed strains. a ,b, ……and f : values in the same column within the same item followed by different superscripts are significantly different at P≤ 0.01

**Table (3): Results of egg quality traits for nine native strains of chickens.**

| Strain | Egg quality traits (EQT) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Exterior EQT | | Interior EQT | | | | | | | |
| | EW (g) | SI (%) | Albumin (%) | Yolk (%) | Y/Alb (%) | Shell (%) | ST (mm) | YC | YI (%) | HU |
| Indigenous strains (IS) | | | | | | | | | | |
| Dandarawi | 39.72$^{d}$ | 78.58$^{a}$ | 59.52$^{d}$ | 28.84$^{bc}$ | 48.66$^{bc}$ | 11.64$^{a}$ | 37.45$^{ab}$ | 6.69$^{c}$ | 44.37$^{ab}$ | 80.81$^{c}$ |
| Fayoumi | 44.59$^{bc}$ | 77.16$^{ab}$ | 55.78$^{e}$ | 33.55$^{a}$ | 60.42$^{a}$ | 10.67$^{bcd}$ | 38.97$^{a}$ | 8.23$^{a}$ | 40.17$^{c}$ | 92.75$^{d}$ |
| Sinai | 49.03$^{a}$ | 75.52$^{b}$ | 61.82$^{bc}$ | 28.16$^{cd}$ | 45.84$^{cd}$ | 10.02$^{d}$ | 35.86$^{bc}$ | 6.93$^{c}$ | 44.55$^{ab}$ | 81.61$^{c}$ |
| Developed strains (DS) | | | | | | | | | | |
| Bahig | 43.23$^{bc}$ | 75.96$^{b}$ | 61.50$^{bc}$ | 27.63$^{cde}$ | 45.30$^{d}$ | 10.87$^{abcd}$ | 36.02$^{bc}$ | 6.83$^{c}$ | 45.98$^{a}$ | 91.57$^{b}$ |
| Golden Montazah | 44.62$^{bc}$ | 76.73$^{b}$ | 61.05$^{cd}$ | 27.45$^{cde}$ | 45.04$^{d}$ | 11.49$^{ab}$ | 35.84$^{bc}$ | 6.71$^{c}$ | 46.33$^{a}$ | 95.04$^{a}$ |
| Inshas | 44.40$^{bc}$ | 76.52$^{b}$ | 62.97$^{ab}$ | 26.94$^{de\ f}$ | 43.0$^{de}$ | 10.09$^{d}$ | 34.78$^{c}$ | 5.62$^{d}$ | 45.38$^{d}$ | 93.32$^{a}$ |
| Mandarah | 42.76$^{c}$ | 76.46$^{b}$ | 62.39$^{abc}$ | 26.39$^{e\ f}$ | 42.63$^{de}$ | 11.21$^{abc}$ | 34.51$^{c}$ | 6.90$^{c}$ | 45.25$^{ab}$ | 91.97$^{ab}$ |
| Matrouh | 44.57$^{bc}$ | 75.88$^{b}$ | 59.86$^{d}$ | 29.83$^{b}$ | 50.07$^{b}$ | 10.30$^{cd}$ | 35.76$^{bc}$ | 7.63$^{bc}$ | 42.50$^{c}$ | 78.80$^{c}$ |
| Salam | 45.30$^{b}$ | 76.39$^{b}$ | 63.57$^{a}$ | 25.72$^{f}$ | 40.61$^{e}$ | 10.79$^{abcd}$ | 34.69$^{c}$ | 7.30$^{bc}$ | 47.23$^{a}$ | 91.44$^{ab}$ |
| *Average, IS* | *44.43* | *77.09* | *59.04* | *30.18* | *51.64* | *10.78* | *37.43* | *7.28* | *43.03* | *85.06* |
| *Average, DS* | *44.15* | *76.32* | *61.89* | *27.33* | *44.44* | *10.79* | *35.27* | *6.83* | *45.45* | *90.36* |

EW: Egg weight, SI: Shape index, Y/Alb%: Yolk to albumen %, ST: Shell thickness, YC: Yolk color, YI: Yolk index, , HU: Haugh unit scores
a, b and c values in the same column within the same item followed by different superscripts are significantly different at P≤ 0.01 .

**Table (4): Results of incubation of eggs from nine native strains of chickens.**

| Strain | Fertility (%) | Dead7 (%) | Dead 21 (%) | Hatchability (%) |
|---|---|---|---|---|
| Indigenous strains (IS) | | | | |
| Dandarawi | 91.01$^{bcd}$ | 7.76$^{ab}$ | 7.86$^{a}$ | 77.52$^{ab}$ |
| Fayoumi | 95.3$^{a}$ | 2.10$^{c}$ | 3.92$^{b}$ | 78.71$^{a}$ |
| Sinai | 90.91$^{cd}$ | 5.56$^{b}$ | 8.66$^{a}$ | 76.68$^{b}$ |
| Developed strains (DS) | | | | |
| Bahig | 91.42$^{bc}$ | 8.65$^{ab}$ | 8.16$^{ab}$ | 76.46$^{b}$ |
| Golden Montazah | 90.33$^{d}$ | 8.43$^{ab}$ | 8.82$^{a}$ | 75.70$^{a}$ |
| Inshas | 90.71$^{cd}$ | 9.13$^{a}$ | 8.41$^{a}$ | 75.97$^{b}$ |
| Mandarah | 91.78$^{b}$ | 8.15$^{ab}$ | 8.55$^{a}$ | 77.39$^{ab}$ |
| Matrouh | 90.97$^{bcd}$ | 8.41$^{ab}$ | 8.68$^{a}$ | 76.28$^{b}$ |
| Salam | 90.76$^{cd}$ | 8.31$^{ab}$ | 9.19$^{a}$ | 75.84$^{b}$ |
| *Average, IS* | *92.41* | *5.14* | *6.81* | *77.64* |
| *Average, DS* | *90.99* | *8.51* | *8.64* | *76.27* |

a, b and c values in the same column within the same item followed by different superscripts are significantly different at $P \leq 0.01$ .

## REFERENCES

**Abdel Galil, M. A. (2004).** *Effect of using some anti- heat stress compounds on the performance of some local breeds of chicken under hot climatic condition. Egypt. Poult. Sci. 24: 417-427.*

**Abdel Gawad, E. M.; Khalid, A. Z.; and Balat, M. (1980).** *Genetic analyses of a new breed of chickens, Mamourah. Egypt. J. Genet. Cytol. 8:303-313.*

**Abdel Latif, H. A. (2001).** *Inheritance of certain plasma constituents and their association with some economic traits in Dandarawi and Golden Montazah hens. M. Sc. Thesis Fac. Agric. Cairo Univ., Egypt.*

**Ahn, D.U.; Kim, S.M.; and Shu, H. (1997).** *Effect of egg size and strain and age of hens on the solids content of chicken eggs. Poult. Sci. 76:914-919.*

**Ali, M.A.; Abo Egla, E.H.; El Wardany, A.M.; Ibrahim, M.A.; and Khalifa, M.M. (1998).** *Effect of force molting method and strain on some post molting traits. 1- Egg production, egg quality, internal organs, fertility and hatchability. J. Agric. Sci. Mansoura Univ., 23: 5923: 5938.*

**Arboleda, C.R. (1987).** *Animal genetic resources conservation and development in Philippines. J. Inst. Animal Sci. 3: 2-7.*

**Bakir, A.A.M.; Mahmoud, T.H.; and El Labban, A.F.M. (2002).** *Inshas: A new Egyptian breed of chickens. Egypt. Poult. Sci. 22: 631.*

**Barker, J.S.F. (1982).** *Evaluation of animal genetic resources. Proc. 2nd SABRAO Workshop Animal Genet. Resour. (Kuala Lampur), 13-16.*

**Bornstein, S.; Plavnik, I.; and Lipstein, B. (1982).** *Evaluation of methanol-grown bacteria and hydrocarbon-grown yeast as sources of protein for poultry: Trials with laying birds. Br. Poult. Sci. 23: 487-499.*

**Cook, F.; and Briggs, G. M. (1977).** *Nutritive value of eggs. Pages 92-108 in: Egg Science and Technology, W. J. Stadelman and O. J. Cotterill, ed. AVI Publishing Co., Westport, CT.*

**Decuypere, E.; Bruggeman, V.; Barbato, G.F.; and Buyse, J. (2003).** *Growth and reproduction problems associated with selection for increased broiler meat production. In Muir, W.M. and S. E. Aggrey. POULTRY GENETICS, BREEDING AND BIOTECHNOLOGY. CABI Publishing, UK, pp 13-28.*

**Duncan, D. B. (1955).** *Multiple range F-tests. Biometrics 11: 1-42.*

**Egyptian Ministerial Decree No. 1498 (1996).** *Egyptian Ministerial decree No. 1498 of the year 1996 (concerning Foodstuffs industry).*

**El Dakroury, A.; and Mahmoud, T.H. (1983).** *Effect of dietary protein level on productive performance and egg quality for silver Montazah and Gimmizah pullets. Agric. Res. Rev. 61:53-69.*

**El Dakroury, A.; and Mahmoud, T.H. (1982).** *Certain factors affecting egg production of two local breeds of chickens. Agric. Res. Rev. 60:87-108.*

**El Itriby, A.A.; and Sayed, I.F. (1966).** *Dokki 4: A new breed of poultry. Agric. Res. Rev. 49:147-154.*

**El Labban, A.F.M. (2000).** *Evaluation of egg quality traits in four locally developed strains of chickens. Proc. Conf. Anim. Prod. In the 21th Century, Sukha, 18-20 April pp: 359-366.*

**Ezzeldin, Z.A.; and El Labban, A.F. (1989a).** *Interior egg quality of purebred and crossbred chickens. Third Egyptian British Conf. On Anim. Fish and Poult. Prod., Alex., pp:971-981.*

**Ezzeldin, Z.A.; and El Labban, A.F. (1989b).** *Egg weight characteristics of purebred and crossbred chickens. Third Egyptian British Conf. On Animal, Fish and Poultry Production, Alex., pp:983-992.*

**FAO (2003).** *FAO, Statistics. Animal Production and health division http://www.fao.org/ag/aga/glipha/index.jsp*

**Haugh, R. R. (1937).** The Haugh unit for measuring egg quality. U. S. Egg and Poult. Magazine 43: 522-555 and 572.

**Hussein, S.M.; Harms, R.H.; and Janky, D.M. (1993).** *Effect of age on the yolk to albumen ratio in chicken eggs. Poult. Sci. 72: 594-597.*

**Kaminska, B.Z.; and Skaraba, B. (1991).** *Analysis of hen types considering albumen: yolk ratio and its changes during the laying cycle. Pages 43-49 in: Proceedings of the 4th European Symposium on the Quality of Poultry Products.II.Eggs and Egg Products. Doorwerth, The Netherlands.*

**Kosba, M.A.; Mahmoud, T.H.; Shawer, M.F.; and Abd Alla, G.M. (1981).** *A comparative study of four breeds of chickens and their F1, crosses. 1-Egg fertility and hatchability. Agric. Res. Rev. 59: 83-91.*

**Kout El Kloub, M.E.; Moustafa, R.A.; Hassan, E.H.; El Ganzory, E.H.; and El Abd, E.A. (2004).** *Effect of different sources and levels of zinc on the performance of local laying hens. Egypt. Poult. Sci. 24: 369-385.*

**Mahmoud, T.H. (2000).** *Improving the performance of local strains of chickens. Proc. Conf. Anim. Prod. In the 21th Century, Sukha, 18-20 April pp: 173-176.*

**Mahmoud, T. H.; Madkour, Y.H.; Sayed, I.F.; and Harirah, K.M. (1974b).** *Matrouh: A new breed of chickens. Agric. Res. Rev. 52:87-96.*

**Mahmoud, T.H.; Sayed, I.F.; and Madkour, Y.H. (1974a).** *The Golden Montazah: A new variety of chickens. Agric. Res. Rev. 52:51-60.*

**Mahmoud, T.H.; Sayed, I.F.; and Madkour, Y.H. (1974c).** *The Silver Montazah: A new variety of chickens. Agric. Res. Rev. 52:97-105.*

**Mahmoud, T.H.; Sayed, I.F.; Madkour, Y.H.; and Honein, M.M. (1982).** *The Gimmizah: A new breed of chickens. Agric. Res. Rev. 60:51-61.*

**Mukerjee, T.K. (1993).** *Breeding and selection programs in developing countries. In Crawford, R. D. POULTRY BREEDING AND GENETICS, Elsevier Science Publishers, The Netherlands.pp 1049-1060.*

**Rasmy, F. (1984).** *Studies on the storage of poultry eggs. M.Sc. Thesis, Fac. Agric. Cairo Univ., Egypt.*

**Saleh, K.; El Sayed, T.M.; and Hataba, N. (1994).** *Results of random sample test of twelve native strains of chickens. pp:42-51. 2nd Sientific Conf. On Poultry, Kafr El Sheikh, Egypt.*

**Steel, R.G.; and Torrie, J.H. (1980).** *Principals and Procedures of Statistics. 2nd Ed. McGraw Hill Book Co., New York, USA.*

**Stino, F.K.R.; Goher, N.E.; Kamar, G.A.R.; and Hanash, N.A. (1982).** *The effect of breed and housing system on the egg quality of White Baladi and Fayoumi hens in the subtropics. Egypt. J. Anim. Prod. 22:191.*

**Suk, Y.O.; and Park, C. (2001).** *Effect of breed and age of hens on the yolk to albumen ratio in two different genetic stocks. Poult. Sci. 80: 855-858.*

## الملخص العربى

### نتائج اختبار العينة العشوائية للأداء الإنتاجي من البيض لتسع سلالات من الدجاج المحلى

إنصاف أحمد الفل، هالة محمد عبد الواحد، محمد مصطفى نمرة، * أحمد محمد رضوان عثمان، نبيل على حطبة

معهد بحوث الإنتاج الحيوانى-الدقى-الجيزة

*قسم إنتاج الدواجن-كلية الزراعة بالفيوم-جامعة القاهرة

استخدمت 9 سلالات أو أصناف من الدجاج المصرى لتقييم نتائج أدائها الإنتاجى من البيض ومعامل التحويل الغذائى لإنتاج البيض ومتوسط وزن الجسم عند النضج الجنسى ونسبتى الخصب والفقس. وخلال فترة الاختبار الكلية، كل الطيور غذيت نفس العليقة والماء وتم الحفاظ عليها تحت نفس الظروف البيئية.

وتم الحصول على النتائج التالية:

1. كان وصول نوعى مطروح وانشاص الى النضج الجنسى مبكرا معنويا ($P\leq0.01$) بنحو5 أو 6أيام عن السلالات الأخرى. وكانت سلالة سينا هى الأثقل وزنا عند النضج الجنسى.
2. كان نوعا السلام والدندراوى هما الأفضل خلال فترات الاختبار الثلاثة والفترة الكلية فى معدلات انتاج البيض. ويمكن اختيار أمهات من السلام والمنتزه الذهبى والمندرة و مطروح لتحسين معدل انتاج البيض% وكتلة البيض المنتجة فى الـ 90يوم الأولى من الانتاج. ويمكن ملاحظة أن السلالات المختبرة لها منحنيات انتاج بيض مختلفة. لذلك يمكن التوصية مستقبلا باختبار الانتاجية لمدة أطول من 12 أسبوع.
3. كانت تقديرات الكفاءة الغذائية، كفاءة تحويل البروتين الخام وكفاءة تحويل الطاقة الممثلة هى الأفضل فى أنواع سلام والمنتزه الذهبى والمندرة والتى أنتجت بيضاً أثقل وزناً.
4. كان لبيض الدندراوى والفيومى دليل شكل أعلى وقشرة بية أسمك من كل السلالات المستنبطة. وكان الفيومى والمطروح أعلى معنويا فى لون الصفار عن السلالات الأخرى.
5. كان الفيومى أعلى معنويا فى نسبة الصفار للبياض عن السلالات الأخرى مما يعنى امكانية أن يكون بيضه مفيدا تصنيع المنتجات المعتمدة على الصفار أكثر من استخدامه كبيض مائدة.
6. الفيومى كان أعلى معنوياً ($P\leq0.01$) فى نسبة الخصوبة عن كافة السلالات المدروسة. كما لوحظت اختلافات معنوية فى نسبة الفقس بين السلالات المحلية والتى ترجع الى الاختلافات فى النفوق الجنينى المتأخر والذى ربما يعكس وجود بعض الجينات المميتة فى هذه القطعان والتى تسبب معدل أعلى للنفوق المتأخر .
7. كانت السلالات المستنبطة المختبرة: المنتزه الذهبى، أنشاص، سلام ومندرة متفوقة فى وحدات هاو عن السلالات المحلية الأخرى.