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GENETIC TRENDS AND EVALUATION FOR SOME PRODUCTIVE TRAITS IN ALEXANDRIA CHCIKENS

By

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Abstract: *This study was carried out on data obtained from the experimental stocks at the Poultry Research Center, Faculty of Agriculture, University of Alexandria, during seven successive years. The experimental stocks comprised two developed lines of Alexandria chickens originated from the base population, through individual selection for high (HL) and low (LL) body weight at 8-week and one population of the Fayoumi (FA) flock kept closed without selection for any trait and used as a control breed.*

Data of 6989, 9128 and 2349 chicks produced from LL, HL and FA populations, respectively, were recorded for traits of body weight at hatch (BWH). 8-weeks (BW8), sexual maturity (BWSM) of age, number of day alive during the period from hatch up to 8 weeks (DL0-8) of age and age at sexual maturity (ASM). Single trait animal model was used to analyze the data. Results showed that estimates of Heritability (h_a^2) for body weight were higher at hatch for the Alexandria HL (0.62) and FA breed (0.36) than at 8-weeks of age (0.29 and 0.17, respectively). While the reveres was true for the LL of Alexandria chickens. Estimates of h] for AGSM were about the same for the LL line (0.06) and FA breed (0.06). While the F1L line had higher estimate of $h^2{}_a$ (0.09). Estimates of genetic correlations (r_G) between productive traits were generally negative and low. It ranged from -0.35 to 0.301 in LL, -0.25 to 0.23 in HL and -0.96 to 0.22 in FA populations. The corresponding estimates of the phenotypic correlations (r_p) were -0.43 to 0.42, -0.43 to 0.34 and -0.89 to 0.362 in the same order.

Genetic trends in LL, HL and FA populations indicate that PBV were mostly positive for all the studied traits. But the plots in LL line *showed that the minimum of predicted breeding values for BW8 reached at the 3rd generation of the study and the plateau reached soon at the 4" generation. While, the plots in HL line indicate that the plateau for BW8 and BWSM reached soon at the 2nd generation, then trends fluctuated to show second plateau at the 5th generation. For FA breed, the plots for BW8 and BWSM were gradually increased to reached the maximum point at the 7th generation. This is due to no selection was practiced in this population. On the other hand, genetic trends for traits of BWH, DL0-8 and AGSM indicate that the change in plots were very low and it had stability after the 2" generation.*

INTRODUCTION

Productive traits in poultry should be selected on the basis of their estimated breeding values rather than on phenotypic performance. Accuracy of estimation of breeding value of the chicks becomes more precise together with an extending for the information not only available on their own performance test but also on both the full and half sibs as well as of the ancestors. The Animal Model is nowadays applied in some species of poultry, but it has not been widely used (Iraqi, 2002). Derivative-Free Restricted Maximum Likelihood Algorithm (DFREML) allows unified approach for genetic evaluation and estimation of variance components for chickens (Mielenz et al., 1994).

When a control population is not available, animal model methodology can be useful for estimating genetic and environmental trends of a selection process (Henderson, 1984). In development and evaluation of breeding programs in chickens, both genetic parameters (e.g. heritability and predicted breeding values) and genetic trends need to be evaluated accurately. Compared to other livestock species, few estimates have been reported on chickens for genetic and environmental trends.

In Egypt, the native breeds like Fayoumi and Alexandria chickens are not evaluated genetically by applying single-trait animal model. Nevertheless, no genetic analysis has been done yet to estimate the genetic trends for productive traits based on new methodology of analysis (e.g. MTDFREML, PEST, MTGSAM, ...etc). Therefore, the main objectives of this work were: (1) To estimate genetic parameters (e.g. direct additive genetic, common environmental effect and error variances as well as heritability) for traits of body weight at hatch (BWH), 8-weeks (BW8), sexual maturity (BWSM) of age, number of day alive during the period from hatch up to 8 weeks (DL0-8) of age and age at sexual maturity (ASM) in chickens of low (LL) and high (HL) lines of Alexandria and Fayoumi (FA) breed, (2) To predict the breeding values for these traits under the study, and (3) To evaluate the genetic trends for the traits over several generations.

MATERIAL AND METHODS

Experimental stocks

Data of the present study had been obtained during seven successive years at the Poultry Research Center of the University of Alexandria, Faculty of Agriculture. The experimental stock comprised two developed lines of Alexandria chickens and one population of the Fayoumi (FA) chickens used as a control. The two Alexandria lines were originated from the base population through selection for high and low eight- week body weight (Shebl 1986). The low (LL) and high (HL) line parents of each generation were at least one standard deviation above or below the mean of the generation from which they were selected. More details about these early steps were reported by Kosba *et al.* (1985) and Shebl, (1986). The control line comprised the Fayoumi flock which has been kept closed and without any selection for any trait.

Breeding plan and management:

A number of breeding pens ranged from 12 to 26 used to produce the chickens of LL and FIL lines of Alexandria chickens, but five pens used for FA breed. Each pen had 6 to 10 pullets randomly mated with a single cockerel of the same line. The identified eggs were collected from dams through trap nesting of individual cages. The eggs were stored at room temperature and set weekly in an electric forced- draft incubators for three months in each season (from November to January). Total number of chicks produced were 6989, 9128 and 2349 of LL, HL and FA populations, respectively. Numbers of sires, dams and chicks produced from the two Alexandria lines and FA breed are presented in Table 1. On hatching day, all chicks were wing-banded, weighted, and brooded in electric battery brooders. At three weeks of age, they were transferred to floor brooders. The chicks were debeaked at about four-weeks of age. At eight-weeks of age, the chicks were sexed, weighed and moved to rearing houses. All chicks were vaccinated against Newcastle disease through the first week and at eight-weeks of age.

Table 1: **Numbers of sires, dams and chicks produced from Alexandria lines and Fayoumi breed of chickens.**

Line or breed	No. of sires	No. of dams	No. of chicks	Total
Low line (LL)	71	488	6989	7548
High line (HL)	99	715	9128	9942
Fayoumi (FA)	36	226	2349	2611

All birds were fed on starter (from hatch to 8 weeks), developer (from 8 to 20 week), and breeder (after 20 week) rations containing 21, 16 and 16% protein; 3.64, 4.06 and 3.8% fat; 2.94, 2.34 and 2.96% fiber; 2825, 2995 and 2579 metabolic energy cal/kg, respectively. Feed and water were provided *ad libitum*. All birds were subjected to the same medication and managerial conditions.

Data

Data of body weights of 6989 LL, 9128 HL and 2349 FA chicks were individually recorded (grams) at hatch (BWH), eight (BW8), sexual maturity (BWSM) weeks of age, age at sexual maturity (AGSM) and numbers of day alive of the chick from hatch up to 8-weeks of age (DL0-8) were also recorded.

Model of **analysis:**

Single- trait animal model was used to analysis the data according to the following linear model (Boldman, et al., 1995):

$$y = Xb + Z_a u_a + Z_c u_c + e$$

Where:

y = n xl vector of the observation on the birds (n= number of records); b = vector of fixed effects of generation (7 generations), hatch (different levels per generation) and sex (2 levels); X = design matrix of order n x p (which relates records to fixed effects); u_a = the vector of random direct additive genetic effect of the bird; u_c = the vector of random common environmental effect (dam family); Za & Zc = the incidence matrices relating records to random direct additive genetic and common environmental effects, respectively; and e = n x 1 vector of random residual effects.

Direct additive, common environment, error and phenotypic variances were estimated. Heritability was estimated from the animal model according to the following equation:

$$h_a^2 = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_c^2 + \sigma_e^2}$$

Where $\sigma_a^2, \sigma_c^2, \sigma_e^2$ and σ_e^2 are variances due to the random effects of direct additive genetic, common environment and error, respectively.

Genetic (r_G) correlation between traits was estimated (based on correlation between predicted breeding values) as follows:

$$r_{xy} \quad \frac{COV \quad (x)_{ij}}{\sqrt{X_{ii} \, X_{jj}}}$$

Where:

COV (X) ij = the additive genetic (a) covariance between the first and second traits; Xa

And X_{ij} = the additive genetic (a) variances of the first and second traits, respectively.

Genetic trend:

The averages of **PBV** were regressed on generation factor to analyze the general trends of these values (Iraqi, et al., 2002). These values were plotted for LL, HL and FA population of chickens separately to illustrate the genetic trend for the productive traits under the study.

RESULTS AND DICUSSION

Means and phenotypic standard deviations for productive traits were presented in Table 2 to characterize the three populations of chickens under the study.

Table 2: **Actual means *(X)*, standard errors (S.E.) and coefficients of variation in Alexandria lines and Fayoumi breed of chickens.**

Trait[+]	No.	*X* ± S.E. Alexandria low line	(cv)	No	*X* ± S.E. Alexandria high line	C.V.	No.	X±S.E. Fayoumi breed	C.V.
BWH	6989	31.30±0.025	6.67	9128	31.67±0.02	7.17	2409	27.20±0.05	9.38
BW8	5845	374.47±1.46	29.86	7911	518.20±1.62	27.75	1882	354.58±2.42	29.62
DL0-8	6989	5I.53±0.I4	22.39	9128	52.59±0.11	18.99	2409	49.89±0.26	25.65
AGSM	820	199.51±0.90	12.87	1184	180.71±0.67	12.73	503	I83.69±l.04	12.72
BWSM	820	1518.6 ±8.5	16.08	1184	1743.26±8.26	16.29	503	I189.37±8.70	16.41

BWH and BW8= body weight at hatch and at 8 weeks of age, respectively; DL0-8= live ability in days during the period from hatch to 8 weeks of age; AGSM= age at sexual maturity; BWSM= B ody in days 1= Body weight at sexual maturity.

Genetic parameters

Estimates of variance components and heritability for productive traits are given in Table 3.

Additive genetic variance (σ_a^2)

Percentages of direct additive genetic variance *{ex])* were higher for body weight at early age (hatch) in both of the Alexandria HL (62.151%) and FA breed (36.35%) and low thereafter at 8-week of age (29.17 and 17.07%, respectively). These results are in agreement with those reported by Iraqi (1999) who found that this percentage for body weight was higher (19.0%) at hatch than that at 8-week (8.0%) of age in chicks of Dokki-4 strain. While the reverse trend was observed for the Alexandria low line (Table 3). This results suggest that there is a decrease in percentage of σ_a^2 at hatch may be due to selection.

For DL0-8, percentages of σ_s^2 were generally low which ranged from 5.92% in LL to 8.83% in HL. These indicate that livability in HL trait could be improved by selection.

For AGSM, percentages σ_a^2 of were moderate and about the same in both of LL (13.96%) and HL (13.33%) of Alexandria chickens, while this percentage was low (4.89%) in the FA breed. While these percentages for BWSM were generally high where the values were 45.49, 44.70 and 43.39%, respectively in LL and HL of Alexandria chickens and FA breed as shown in Table 3. King and Henderson (1954 a and b) have emphasized that all genotypes are not represented equally in all hatches and this unequal representation influence the estimates of genetic variance.

Common environmental variance (σ_c^2)

Results given in Table 3 show that percentage of σ_a^2 for body weight at hatch were high (ranged from 24.95 to 31.67%) and then declined thereafter (ranged from 16.21 to 16.97%) with the advancement of age (at 8-weeks of age) in the three populations. This reflect the importance of maternal effect on the chicks at early ages than later ones. These results are in agreement with those reported by Iraqi (1999) who found that this percentage was large for body weight at hatching age (25.3%) and declined to 19.2% at 8-week of age. Hanafi et al. (1991) stated that maternal ability effects on body weights tended to decrease generally as the offspring advanced in age. On the other hand, percentage of (σ_a^2) for DLO-8 trait was higher in LL (11.76%) and HL (8.84%) of Alexandria chickens than that of FA breed (4.43%). Percentages of (σ_a^2) in LL, HL and FA populations were 8.72, 0.78 and 52.84% for AGSM; 54.51, 4.80 and 24.52% for BWSM, respectively.

Common environmental effects which affected the growth of progeny is due to-some extent - the genetic variation for some characters of the dam like mothering ability or maternal effect (Mrode, 1996 and Le Biaham-Duval et al., 1997). In addition to that, another source of common environmental variance raised between families may be due to factor such as nutrition and /or climatic conditions. All sorts of relatives are subjected to environmental sources of resemblance (Aggrey and Cheng, 1994 and Mrode, 1996).

Heritability (h_a^2)

Estimates of heritability (h_a^2) for body weight were higher at hatch in Alexandria HL (0.62) and FA breed (0.36) than at 8-week of age (0.29 and 0.17, respectively). While the reverse was true for the Alexandria LL. Iraqi (1999) found that estimates of (h_a^2) (based on single-trait animal model) were 0.20 and 0.08 for body weight at hatch and at 8-week of age, respectively.

Estimate of (h_a^2) was 0.36 for BWH in FA breed which higher than estimate of 0.17 in FA breed (based on sire component of variance) as reported by Kosba and Eid (1983). For DL0-8 trait, estimates of (h_a^2) were generally low (ranged from 0.06 to 0.09) in the studied three populations (Table 3).

Estimates of h_a^2 for AGSM in two lines of Alexandria chickens were lower than those of 0.49 and 0.15 obtained by Shebl (1991), Ali (1992) and Kosba et al. (1997) who working on Alexandria chickens and 0.32 obtained by Ghanem, Hanan (2003) who working on egg line of Alexandria chickens (based on sire variance component). Also, estimate of h_a^2 for AGSM in the FA breed (0.05) obtained in the present study was lower than estimates of 0.14 based on sire component of variance obtained by Kosba et al.(1977) working on the same strain.

Estimate of h_a^2 were 0.46, 0.45 and 0.44 for BWSM in LL and HL of Alexandria chickens and FA breed, respectively. These estimates were higher than those of 0.19 and 0.03 as obtained by Ghanem, Hanan (2003) and Abd-El-Halim (1999) based on sire component of variance in egg line of Alexandria strain.

Genetic and phenotypic correlations:

Estimates of genetic correlations (r_G) between productive traits were generally negative and low in LL and FA populations. It ranged from -0.35 to 0.30 in LL, -0.25 to 0.30 in HL and -0.96 to 0.22 in FA populations (Table 4). The corresponding estimates of the phenotypic correlations (r_P) were -0.43 to 0.42, -0.43 to 0.34 and -0.89 to 0.36 in the same order. All genetic and phenotypic correlations were significant (P< 0.05 and 0.01).

The r_G estimates between body weights in Alexandria chickens tended to decline with age or as the interval between the two ages got larger, since these estimates declines from 0.03 between BWH and BW8 to 0.01 between BWH and BWSM. **El-Hossari** (1971) found that r_Q between BWH and BW8 was 0.27 in FA breed. **Iraqi** (1999) obtained an estimates of 0.34 and 0.18 for the genetic and phenotypic correlations, respectively, between BWH and BW8 using multi-trait animal model in Dokki-4 chickens. Also these results are in agreement with these reported by Khan, et al. (1994) and Danbaro, et al. (1995).

Both of genetic and phenotypic correlation estimates between BW8 and DL0-8 traits were negative in each of the low and high lines of Alexandria chickens while they were positive in the FA breed. All these estimates were significant (P<0.01) as shown in Table 4.

All estimates of the genetic and phenotypic correlations between BW8 and AGSM were negative and significant at PO.01 (Table 4). The genetic correlation estimates between BW8 and BWSM were positive and somewhat higher for the low (0.301) than the high (0.299) lines of Alexandria chickens. The same trend was found for the phenotypic correlation between these two traits (0.42 and 0.34 in LL and HL of Alexandria chickens, respectively). For the FA breed, these estimates were negative (-0.11) and positive (0.36) for the genetic and phenotypic correlations, respectively.

Age at sexual maturity exhibited a low positive genetic and phenotypic correlations with body weight at the same age for the low and high lines of Alexandria chickens. However, these estimates were negative and higher in the FA breed.

Table 3: Estimates of direct additive genetic (σ^2_A), common environmental (σ^2_C) and error (σ^2_{pe}) variances and their percentages to the phenotypic variance (σ^2_P) for productive traits in two Alexandria lines and Fayoumi breed of chickens.

Trait[+]	Line or breed	Variance components							Heritability
		Direct additive genetic		Common environment		Error		Phenotypic	
		σ^2_a	%	σ^2_C	%	σ^2_e	%	σ^2_P	
	Alexandria low line	1.175	29.63	1.254	31.62	1.537	38.75	3.97	0.30
BWH	Alexandria high line	2.785	62.15	1.118	24.92	0.578	12.89	4.48	0.62
	Fayoumi breed	2.076	36.35	1.809	31.67	1.827	31.99	5.71	0.36
	Alexandria low line	2832.769	32.06	1499.650	16.97	4503.611	50.97	8836.03	0.32
BW8	Alexandria high line	3751.876	29.17	2479.290	19.27	6631.689	51.56	12862.86	0.29
	Fayoumi breed	1067.750	17.07	1013.920	16.21	4474.770	66.73	6256.44	0.17
	Alexandria low line	1.967	5.92	3.910	11.76	27.359	82.32	33.24	0.06
DL0-8	Alexandria high line	2.292	8.83	2.294	8.84	21.378	82.34	25.96	0.09
	Fayoumi breed	2.259	5.94	1.877	4.93	33.914	89.13	38.05	0.06
	Alexandria low line	79.442	13.96	49.655	8.72	440.107	77.32	569.20	0.14
AGSM	Alexandria high line	49.388	13.33	2.814	0.76	318.226	85.91	370.43	0.13
	Fayoumi breed	22.315	4.89	241.231	52.84	192.297	42.27	456.52	0.05
	Alexandria low line	9492.520	45.49	11372.798	54.51	0.002	0.00	20865.32	0.46
BWSM	Alexandria high line	29231.177	44.70	3138.410	4.80	33027.390	50.50	65396.98	0.45
	Fayoumi breed	11253.940	43.39	6360.350	24.52	8322.191	32.09	25936.48	0.43

[+] traits as defined in Table 2.

Table 4: Genetic and phenotypic correlation estimates between productive traits in Alexandria lines and Fayoumi breed of chickens.

Correlated traits*	Line or breed		
Correlated traits+	Alexandria low line	Alexandria high line	Fayoumi breed
Genetic correlation:			
BWH& BW8	-0.11**	0.03**	-0.14**
BWH& DL0-8	-0.05**	0.09**	0.02*
BWH& AGSM	0.10**	0.04**	0.16"
BWH & BWSM	0.03*	0.01*	0.14"
BW8& DLO-8	-0.19**	-0.15**	0.22**
BW8& AGSM	-0.13**	-0.25**	-0.02**
BW8& BWSM	0.30"	0.30**	-0.11**
DLO-8 & AGSM	-0.05**	0.10**	-0.12**
DL0-8& BWSM	-0.35**	-0.08**	-0.11**
AGSM & BWSM	0.12**	0.05**	-0.96**
Phenotypic correlation:			
BWH& BW8	0.13**	0.04**	-0.14**
BWH& DLO-8	0.27**	0.19**	0.12**
BWH & AGSM	0.19**	0.05**	0.25**
BWH & BWSM	0.04*	0.02*	0.24"
BW8& DLO-8	-0.29**	-0.24**	0.31**
BW8& AGSM	-0.26**	-0.43**	-0.23**
BW8& BWSM	0.42**	0.34**	0.36**
DLO-8 & AGSM	-0.14**	0.22**	-0.14**
DLO-8 & BWSM0.0	-0.43**	-0.18**	-0.12**
AGSM & BWSM	0.14**	0.06**	-0.89**

+Traits as defined in Table 2.

* Significant at PO.05; " Significant at P <0.01.

Genetic trend:

Genetic trends for productive traits in LL, HL and FA population of chickens are shown in Figures 1, 2 and 3. Genetic trends in the three populations indicate that PBV were mostly positive for all the studied traits.

For LL line, genetic trends in Figure 1 indicate that the minimum of PBV for BW8 reached at the 3rd generation of the study and the plateau reached soon at the 4th generation. Moreover, the genetic trend fluctuated down to show a negative trend and converted to show positive at the 7 generation thereafter. Genetic trend for BWSM as the important one correlated trait showed that plot progressed as soon at the 2nd generation and then inconsistent from generation to another up to the end of the study. The inconsistency could be attributed to experimental errors and genetic drift for obtaining correlated response to body weight at 8 weeks (Zhang, et al. 2005)

For HL line, genetic trends in Figure 2 indicate that the plateau for BW8 and reached soon at the 2nd generation of the study, then the trend slowly down to show the minimum point (but positive) at the 4lh generation and converted to show new plateau at the 5th generation and converted down thereafter. Genetic trend for BWSM as the correlated trait showed that plot had the same trend for BW8, while the progress of PBV's were higher in the HL then in LL. This is because the genetic

correlation between BW8 and BWSM was significant ($P<0.01$). The results demonstrated that highest progress could be obtained by incorporating BWSM into selection programs **(Zhang, et al. 2005)**

For FA breed, genetic trend in Figure 3 indicate that the plots for BW8 as well as for BWSM was gradually increased to reached the maximum point at the 7 generation. This is due to no selection was practiced in this population, therefore no homogeneity in additive genes for these traits was occurred because a random mating was practiced.

On the other hand, genetic trends in Figures 1&2&3 indicate that the change in plots for traits of BWH, DLO-8 and AGSM, as the correlated traits, were very low and they had stability after the 2nd generation. This indicate that there are no genetic progress obtained for these traits in the three populations of chickens all over the period of the study. This could be due to the lowest genetic correlations among these traits with body weight at 8 weeks (Khan, et al., 1994; Danbaro, et al., 1995).

Figure 1: Genetic trend for productive traits in Alexandria low line chickens.

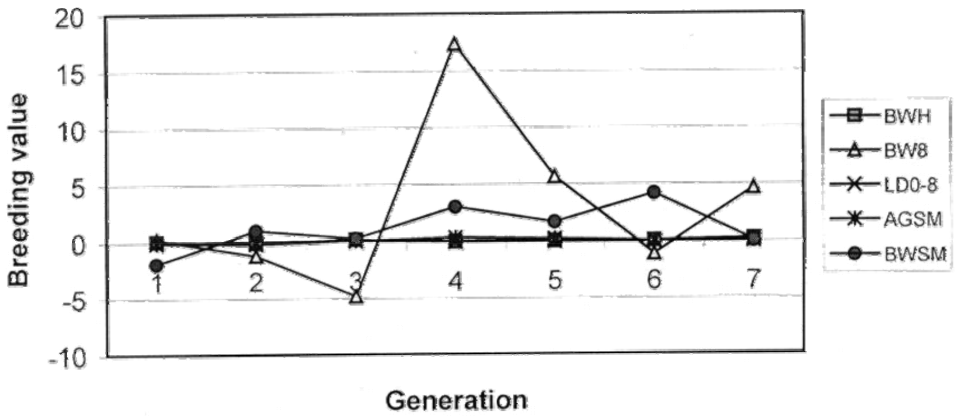


Figure 2: Genetic trend for productive traits in Alexandria high line chickens.

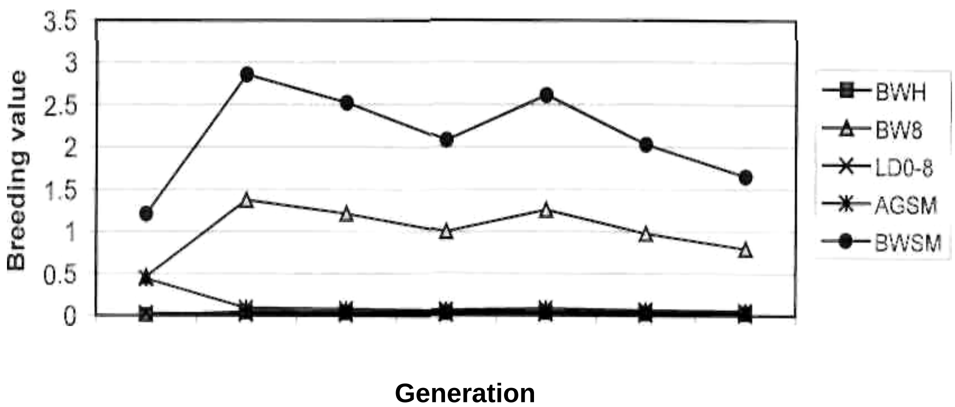
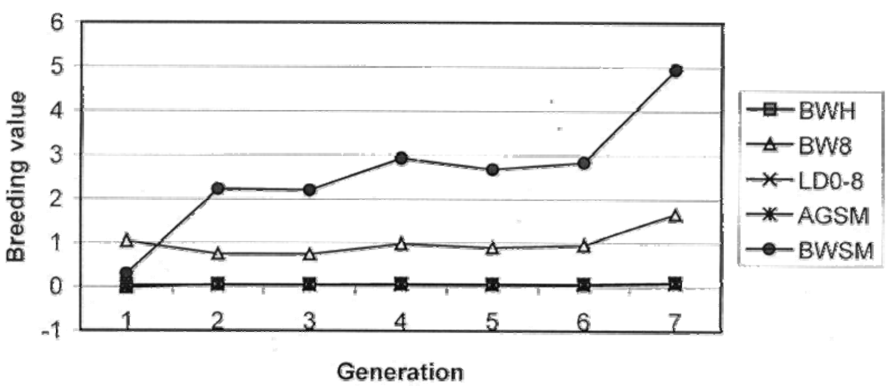


Figure 3: Genetic trend for productive traits in Fayoumi chickens.



REFERENCES

Abd El-Halim, H.A., 1999. *Selection and genetic analysis of some meat and egg production traits in local chickens. M.Sc. Thesis, Fac. of Agric, Alex. Univ., Egypt.*

Aggrey, S.E., and K. M. Cheng, 1994. *Animal model analysis of genetic (co) variances for growth traits in Japanese quail. Poult. Sci. 73: 1822-1828.*

Ali, O.M., 1992. *Selection for improving egg-mass in Alexandria strain of chickens.* M. Sc. Thesis, Fac. of Agric, Alex. Univ., Egypt.

Boldman, K.G., L. A. Kriese, L. D. Van Kleck, C. P. Van Tassell, and S. D. Kachman, 1995. *A manual for use of MTDFREML. A set of programs to obtain estimates of variances and covariances [DRAFT]-. U. S. Dep. of Agric, Agric Res. Services, USA. (cited by Iraqi 1999)*

Danbaro, G., K. Oyama, F. Mukai, S. Tsuji, T. Tateishi, and M. Mare, 1995. *Genetic trends from a selection sex periment in broiler breeder lines using best linear unbiased prediction methodology. Japanese Poult. Sci. 32: 379-386.*

El-Hossari, M. A., 1971. *The significance of variance analysis of growth characteristics in Fayoumi chickens. Agric. Res. Rev. Cairo, Egypt 49 (1) 93- 61.*

Ghanem, H. Hanan, 2003. *Selection for age at sexual maturity in Alexandria chickens. M. Sc. Thesis, Fac of Agric, Alex. Univ., Egypt.*

Hanafi, M.S., M.H. Khalil, Z.A. Ezzeldin, and Z.A. Sabra, 1991. *Estimation of heterosis and combining abilities for body weights and measurements in chickens. Egyptian J. of Animal production 28: 191-210.*

Henderson, C. R. (1984). *Applications of Linear Models in Animal Breeding.* University of Guelph Press, Guelph, Canada.

Iraqi, M.M., 1999. *Estimation and evaluation of sire transmitting abilities for growth traits in chickens. Ph.D. Thesis, Fac. Of Agric, Moshtohor, Zagazig Univ., Egypt.*

Iraqi, M.M, M.H. Khalil, A.F.M. EI- Labban, M.S. Hananfi, and R. Fries, 2002. *Genetic evaluation for growth traits of Dokki-4 chickens using animal models. Egypt J. Agric. Res. 80:1809-1828.*

Khan, A. G., M. V. Poulose, P. N. Shrivastava, and O. P. Dutta, 1994. *Heritabilities and genetic correlations for body weight in dwarf broilers. Indian J. Animals Science 64 :1383-1384.*

King, S.C., and C.R. Henderson, 1954a. *Variance components analysis in heritability studies. Poult. Sci, 33: 147-154.*

King, S.C., and C.R. Henderson, 1954b. *Heritability of egg production. Poult. Sci., 33:155-169.*

Kosba, M.A., and S. **M. Eid, 1983.** *Embryo and chick weight's hertibilities of the new Alexandria strains and the Fayoumi chickens. Egyptian J. Genet. Cytol. 12(1): 137-153.*

Kosba, M.A., M.F. Shawer, and H.M. El-Ibiary, 1977. *Selection for age at sexual maturity in chickens under different mating systems. Egypt. J. Genet. Cytol. 6:154-161.*

Kosba, M.A., Safaa. M. Hamdy, and M.K. Shebl, 1985. *Parent offspring body weight relationships in Alexandria and Fayoumi chickens. Alex. J. Agric. Res.30:707-716.*

Kosba, M.A., G.E. Hassan, M.F. Hassan, M. Bahie El-Deen, and Hanan H.Ghanem, 1997. *Selection and correlated response for age at sexual maturity in Alexandria chickens. 2^n Hungarian. Egyptian Conf. Godollo 16-19 sep. 1997.*

Le Bihan-Duval, E., C. Beaumont, and J.J. Collcau, 1997. *Estimation of thegenetic correlations between twisted legs and growth or conformation traits in broiler chickens. J. Anim. Breed. Genet. 114:239-259.*

Mielenz, N., Groeneveld, E., Muller, J. & Spilke, J. (1994). *Simultaneous estimation of variances and covariances using REML and Henderson 3 in a selected population of White Leghorns. British Poultry Science 35(5): 669-676.*

Mrode, R.A., 1996. *Linear models for the prediction of animal breeding values. CAB International, Biddies Ltd, Guildford, UK.*

Shebl, M.K., 1986. *Responses to individual and index selection for some economic traits in Alexandria chickens. Ph. D. Thesis, Fac. of-Agric, Alex. Univ., Egypt.*

Shebl, M.K., 1991. *Inheritance of age at sexual maturity and its relationship with egg production traits in Alexandria strain chickens. Egypt. Poult. Sci. 11: 413-427.*

Zhang, W., Aggrey, S. E., **Pesti, G. M., Bakalli, R. I. and H. M. Edwards, Jr. (2005).** *Genetic Analysis on the Direct Response to Divergent Selection for Phytate Phosphorus Bioavailability in **a** Randombred Chicken Population Poultry Science 84:370-375.*

Zhang, W., Aggrey, S. E., Pesti, G. M., Bakalli, R. I. and H. M. Edwards, Jr. (2005). *Correlated Responses to Divergent Selection for Phytate Phosphorus Bioavailability in a Randombred Chicken Population. Poultry Science 84:536-542.*

الملخص العربى

التقييم والاتجاهات الوراثية لبعض الصفات الانتاجية فى الدجاج الاسكندراني

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أجريت هذه الدراسة بمركز أبحاث الدواجن – كلية الزراعة – جامعة الاسكندرية-على بيانات تم الحصول عليها فى قطيعان تجريبية وقد شملت الدراسة سلالتين من الدجاج الاسكندرانى (الاولى أنتخبت لوزن الجسم المرتفع عند عمر ٨اسابيع و الثانية أنتخبت لوزن الجسم المنخفض عند نفس العمر) والقطيع الثالث مكون من الدجاج الفيومى الذى حفظ دون ممارسة أى نوع من الانتخاب (قطيع المقارنة)

وقد سجلت بيانات ٦٩٨٩، ٩١٢٨، ٢٣٤٩ كتكوت نتجت من الدجاج الاسكندرانى المنتخب لوزن الجسم المنخفض و المرتفع و الدجاج الفيومى (العشيرة المقارنة) – على التوالى لصفات وزن الجسم عند عمر الفقس ٨ أسابيع عمر النضج الجنسى وكذلك سجلت صفة الحياتية باليوم للكتاكيت

من عمر يوم وحتى ٨ اسابيع ،العمر عند النضوج الجنسى وقد أستخدمة نموذج الحيوان وحيد الصفة فى تحليل البيانات وأظهرت النتائج مايلى:-

كانت قيم المكافئ الوراثى لصفة وزن الجسم عند عمر الفقس مرتفعة (٠,٦٢) فى السلالة المنتخبة لوزن الجسم المرفع ومتوسطة(٠,٣٦) فى دجاج الفيومى بالمقارنة بصفة السلالة المنتخبة لوزن الجسم عند عمر ٨اسابيع بينما وجد أتجاه عكسى لقيم المكافئ الوراثى واحدة فى كل من السلالة المنتخبة لوزن الجسم المنخفض ودجاج الفيومى لصفى العمر عند النضج الجنسى،بينما كانت القيم أعلى فى لسلالة الدجاج المنتخب للوزن المرتفع كانت قيم الارتباطات الوراثية بين الصفات الانتاجية منخفضة وسالبة حيث تراوحت القيم من ٠,٣٥ الى٠,٣٠ فى الدجاج المنتخب للوزن المنخفض ومن -٠,٢٥ الى ٠,٢٣ فى الدجاج المنتخب للوزن المرتفع ومن -٠,٩٦ الى ٠,٢٢ فى الدجاج الفيومى وكانت قيم الارتباطات المظهرية المناظرة على التوالى متراوحة من -٠,٤٣ الى ٠,٤٢ من -٠,٤٣ الى ٠,٤٣ من -٠,٨٩ الى ٠,٣٦

اظهرت الاتجاهات الوراثية فى الدجاج المنتخب لوزن الجسم المرتفع و المنخفض ودجاج الفيومى أن القيم التربوية المتوقعة بصفة عامة كانت موجبة لكل الصفات المدروسة . وبنيت الاتجاهات الوراثية لسلالة الدجاج المنتخب للوزن المنخفض أن أقل قيم تربوية متوقعة تم الحصول عليها بعد ثلاثة أجيال وتم الوصول سريعا الى الهضبة الانتخابية فى الجيل الرابع لصفة وزن الجسم عند عمر ٨اسابيع بيينما أوضحت الاتجاهات الوراثسة لسلالة الدجاج المنتخب للوزن المرتفع أن الهضبة الانتخابية تم الوصول اليها فى الجيل الثانى لصفتى وزن الجسم عند عمر ٨اسابيع وعند النضج الجنس ثم تذبذبت تلك الاتجاهات بعد ذلك مبينه ظهور هضبة أنتخابية ثانية فى الجيل الخامس فى الدجاج الفيومى أوضحت الاتجاهات وجود أزدياد مستمر فى التحسين الوراثى حتى وصل الى اقصى أرتفاع فى الجيل السابع لصفتى وزن الجسم عند عمر ٨ أسابيع والنضج الجنسى وهذا راجع الى عدم ممارسة الأنتخاب فى هذا المجتمع وعلى الجانب الاخر أوضحت الاتجاهات الوراثة أيضا أن معدل ممارسة التغير فى القيم التربوية المتوقعة كان منخفض جدا لصفات وزن الجسم عند عمر الفقس و الحياتية و العمر عند النضج الجنسى أن هذه التغيرات قد حدث لها ثبات بعد الجيل الثانى فى كل العشائر المتزاوجة.