Egypt.Poult. Sci.Vol(37)(IV): (1261-1271)(2017) **(1772)**

Egyptian Poultry Science Journal

http://www.epsaegypt.com

ISSN: 1110-5623 (Print) – 2090-0570 (Online)

EFFECT OF CROSSING BETWEEN LOHMAN SELECTED LEGHORN WITH TWO DEVELEPED STRAINS OF CHICKENS FOR IMPROVING SOME EGG PRODUCTION TRAITS

Ahmed Abd El-Monem Debes

Anim. Prod. Res. Inst., Agric. Res. Center., Ministry of Agric, Egypt

Corresponding author: aboudlt@yahoo.com

Received: 12 / 11 /2017 Accepted: 28 / 11 /2017

ABSTRACT: The objective of this study was improving egg production traits in two developed local strains of chickens by crossing.Two developed strains of chickens, Matrouh (MT) and Silver Montazah (SM) were used as sire lines and a commercial strain Lohman Selected Leghorn (LSL) was used as a dam line to produce five genotypes, three pure lines and two crosses, SMXLSL and MTXLSL. Age (ASM) and body weight (BWSM) at sexual maturity were recorded individually. Egg number (EN) and egg weight (EW) during different periods of production were recorded and egg mass production (EM) was calculated. Heteroses percentage (H%) also, were estimated the different studied traits. Estimates of phenotypic correlation coefficients between egg number during the 1st 90 day of laying and some egg production traits were estimated.

Results showed that:

1- The pure lines matured significantly earlier (175.65d)than the two way cross (186.03d), while BWSM had insignificant difference between the pure and the cross groups.

2- The two-way cross SMXLSL produced significantly (P≤ 0.01) higher EN and EM than MTXLSL cross for all studied periods.

3- Estimates of H% for ASM and BWSM were positive and high for SMXLSL cross (4.55% and 9.52%), respectively, and 2.98% and 4.35% for MTXLSL crossbred, respectively, while it was negative (-15.89 and -15.54%) for EN during the 1st 90 day of laying for SMXLSL and MTXLSL crossbred, respectively.

4- Positive and high H% were found for both of the SMXLSL and MTXLSL crossbred for EM during the last two studied periods (EM2 and EM3),while negative H% was found for EM1 in the same crosses. These results indicated that the two-way cross improved the annual egg mass production by 26.03% and 37.66% for both of SMXLSL and MTXLSL crosses, respectively.

5- The phenotypic correlation between the annual egg production record and the partial record was low for the developed strains, while, it was high for the commercial one (LSL). Also, it was high for the two- way crosses.

Generally, these results indicate that crossing between LSL and /or Matrouh, Silver Montazah strains improved egg production traits. Mating Silver Montazah sire line with LSL dam line improved egg number and egg mass production at the different studied periods compared to the other cross.

Key words: crossing - egg production traits – heterosis - correlation.

INTRODUCTION

Crossbreeding is one of the tools for exploiting genetic variation. The main purpose of crossing in chicken is to produce superior crosses (make use of hybridvigor) to improve fitness and fertility traits and to improve different characteristics in which the crossed breed were valuable (Willham and Pollak, 1985; Hanafi and Iraqi, 2001). Local breeds have better survival than the commercial hybrid strain under local production conditions, but they had poor egg production.Several investigators confirmed the superiority of cross breeds over the pure breeds in two or three way crosses for egg production traits, Ghanem et al. (2008) found that two way cross (Silver Montazah x Matrouh or Inshas x Matrouh) improved egg number and egg mass production compared with the pure strains. As a consequence of crossing Matrouh as a sire parent with Silver Montazah, Mandarah and Inshas developed strains of chicken (Ghanemet al.,2008) reported that egg production can be benefited by reducing age at sexual maturity and increasing egg weight at different ages of production. Ghanemet al. (2012) reported that 3-way cross achieved superiority of egg number and egg mass means than those of the single cross (Mandarah x Lohman Brown (LB) or Silver Montazah x LB) and that of the commercial strain LB.

Heterosis is the phenotypic expression of a complex phenomenon which may involve several types of genetic effects like dominance and epistasis. In animal breeding, basic quantitative genetics theory indicates that heterosis should be proportional to differences in gene frequency between populations (Falconer and Mackay, 1996), so it is commonly used for planning crosses.

The heterosis for egg production reported in literature is highly variable, as it depends on the nature and degree of differences among strains, but it is often around 10% or greater (Fairfull, 1990). The objectives of this study were improving egg production traits in developed local strains of chickens by crossing and to estimate 1- Heterosis percent produced from the crosses of LSL dam with Silver Montazah and Matrouh sire strains of chickens.2- Estimate the phenotypic correlation coefficient between egg number at the 1st 90days of laying and body weight and age at sexual maturity, and annual egg production traits.

MATERIALS AND METHODS

This study was carried out at El-Sabahia Poultry Research Station, Alexandria, Animal Production Research Institute, Agriculture Research Center, Egypt.

Two developed strains of chickens, Matrouh (MT) and Silver Montazah (SM) were used as sire lines and commercial strain Lohman Selected Leghorn (LSL) was used as a dam line to produce five genotypes (three pure lines and two crosses, SMXLSL and MTXLSL) (Table 1).Artificial insemination has been applied by assigning four females to each male.

Flock management:

Two hatches in each generation were used, for each hatch; eggs were collected throughout 7 days and incubated in full automatic draft machine. At hatch, the chicks were wing banded and weighed at the nearest gram. The chicks were brooded and fed ad libitum a commercial starter diet (19% CP and 2800 kcal) up to 8 weeks of age, grower diet (15% CP and 2700 kcal) up to 20 weeks and layer diet (15% CP and 2750 Kcal), thereafter, sexes were separated at 8 weeks of age and birds were reared to 20 weeks of age under the same conditions. At 16 weeks of age, pullets from all genotype groups were translated to individual cages to record annual egg production.

Studied traits:

1- Body weight and age at sexual maturity (BWSM and ASM).

2- Egg number (EN1), egg weight (EW1) and egg mass production (EM1) during the 1st 90days of laying.

3- Egg number (EN2), egg weight (EW2) and egg mass production (EM2) during the 1st 240 days of laying.

4- Egg number (EN3), egg weight (EW3) and egg mass production (EM3) during the 1st 365 days of laying.

5- Estimated heterosis percentage (H %) for the studied traits.

6- Estimated the phenotypic correlations between egg number during the 1^{st}90days of laying and some of egg production traits.

Statistical analysis:

Data for all traits were analyzed using (SAS, 2000), Duncan's multiple range test (Duncan, 1955) were used to separate significant means (P< 0.05).

$Yij= \mu + Li + eij$

Where: μ = the overall mean,

Li = the effect of genetic group,

eij= the remainder error.

Estimated the heterosis percentage (H%) for the first generationwas measured by comparing the mean of F1 offspring with the mean of pure bred parents (Sheridan, 1986).

H % = {[F1 - (Mid parents)] / Mid parents} X 100

Phenotypic correlation coefficients between egg number during the 1^{st} 90 days of laying and body weight and age at sexual maturity and annual egg production traits were estimated using SAS computation program (SAS Institute, 2000).

RESULTS AND DISCUSSION

Means:

Pullets of LSL strain matured significantly early (149.65d) compared with the other two local strains, also, with the two-way crosses. The two-way crosses (MTXLSL)and (SMXLSL)matured earlier by 1.93d and 3.28d than Matrouh (MT) and Silver Montazah (SM) strains, respectively (Table 2). Generally, the pure lines matured significantly earlier by about two weeks than those of the two-way crosses (175.65d vs 186 d).

Results of age at sexual maturity (ASM) reported herein and the differences among genotype groups were reported by other investigators (Bahieeldeenetal.,2009;Iraqi etal., 2012; Ghanem et al., 2012 and Khawajaetal., 2013a).

Silver Montazah (SM) strain was the heaviest (P≤ 0.01) at sexual maturity (1550.76g) compared with the other pure strains, Table 2,while the two-way cross SMXLSL had heavier BWSM (1553.22g) than MTXLSL(1479.91g).These results were ina greement with those reported by Iraqi (2008) and Abou El-Gharet al.(2010).

Means of egg number at different studied periods are presented in Table 3. The LSL and SM strains produced the highest (P≤ 0.01) number of eggs during both the 1^{st} 90 day of laying and the annual egg number, while, MT strain had the lowest egg number during the same periods. On the other hand, the two-way cross SMXLSL produced significantly (P≤0.01) higher egg number than

MTXLSL cross for all studied periods. Concerning the effect of crossing, pullets of pure breeds produced higher EN1comperd with those of the two-way crosses. Generally, it can be concluded from the present results that when used SM strain as a sire line, favored EN during all experiment periods, these results may be due to the genetic make up to these strains witch SM was developed by crossing RIR with Dokki-4 (Mahmoud et al., 1974b), while MT strain was developed by crossing White Leghorn with Dokki-4(Mahmoud et al.,1974a).

These results are in agreement with those reported by Ghanem et al.(2012), Khawaja etal.(2013a) and Amuzu-Aweh et al.(2015).

Pullets of LSL strain produced significantly the heaviest ($P\leq 0.01$) eggs during all studied periods when compared with the other genetic groups (Table 4),while the MTXLSL and SMXLSL crosses had nearly similar averages of EW1, EW2 and EW3 (52.78g,55.23g and 56.28g)for MTXLSL, respectively, and 52.93g, 55.74g and 56.23g for SMXLSL, respectively. The same finding was reported by AbouEl-Gharet al. (2011).

The two-way crosses had the highest ($P\leq 0.01$) egg mass production(EM) during the 1st 240 and 365 day of laying compared with the other genetic groups (Table5), where SMXLSL cross produced higher EM (2148.86g,8432.30g and 11830.34g) during the 1st 90,240 and 365 day of laying, respectively, than MTXLSL cross (2009.9g,8037.27g and 11165.92g) during the same periods, respectively. Similar results were reported by Ghanem et al.(2012).These results showed clearly that EM trait is a combination of two traits, egg number and egg weight, and it was mainly affected by the first one. Moreover, epistatic effects may control the inheritance of egg number and egg mass traits. These observations are needed when applying a combined crossbred and purebred selection method to achieve genetic progress for egg production in crossbreds. The same conclusion was cited by Wei and van der Werf (1994) and Abou El-Gharet al.(2010).

Direct Heterosis Percentage:

Heterosis percentage (H%) for the studied egg production traits are shown in Table(6).Estimates of H% for ASM and BWSM were positive and high for SMXLSL cross (4.55% and 9.52%), respectively, and 2.98%, 4.35% for MTXLSL crossbred, respectively Fairfullet al. (1985 and 1987)found insignificant estimates of H% for sexual maturity (0 to -9 %) also,no heterotic effects were reported by Nawar and Abdou (1999) and El-Tahawy (2000). H% was negative (-15.89 and -15.54%) for egg number during the 1st 90 day of laying for SMXLSL and MTXLSL crossbred, respectively..Heterosis for EN of Leghorn crosses involves both dominance and epistasis (Fairfull et al., 1985 and 1987) ranged from – 3 to 30 % (in two-way crosses). They found maternal heterosis for early egg production significant in hen-houses production, and closely approximates expectations resulting from dominance in three– and four crosses equal to that of two-way crosses. Khalil et al.(2004) found that estimates of heterosis percentage for EN1 was -1.3% for the cross of Baladi Saudi X White Leghorn,also, Amin (2008) reported that heterosis percentage was negative for egg number during the 1st 90 day of laying and positive for ASM.Aly et al. (2005) reported that different Egyptian strains are good combiners for egg production traits,

Concerning, egg number during the 1st 240 day of laying and annual egg number, positive H% were obtained for MTXLSL and SMXLSL crossbred. These results indicated that sire line (Matrouh or Silver Montazah strains) may be have dominant effect of genes. Similar results were found by other investigators (Khalil etal., 2004; Iraqi, 2008; Iraqi et al., 2012 and Ghanem et al., 2012).The H% for MTXLSL and SMXLSL were positive and moderate for EW1 (2.15% and 2.1%), respectively, while it was negative and low for EW2 (-0.41) for MTXLSL and EW3 (-0.20) for SMXLSL crossbred. Also, negative H% for egg weight were reported by Ghanem et al.(2013) and Abou El-Ghar et al.(2012).

Positive and high heterosis percentages were found for the SMXLSL and MTXLSL crossbred for egg mass production during the last two studied periods (EM2 and EM3),while negative H% was found for EM1 in the same crosses. These results indicated that the two-way crosses improved annual egg mass by 26.03% and 37.66% for SMXLSL and MTXLSL crosses, respectively. This result was higher than that reported by Waleed et al. (2011) who reported that percentage of heterosis ranged from 4.4 to 22.9% for egg mass production.

Phenotypic Correlation Coefficient:

Phenotypic correlation coefficients (rp) among egg number during the 1st 90 day of laying and some egg production traits for the studied strains and their crosses were shown in Table (8). The rp between EN1 and BWSM was positive and significant in the pure strains, while it was negative and moderate for MTXLSL cross. Also, significant and negative rp between EN1 and ASM for all genetic groups were found except that for MT strain which had positive and low phenotypic correlation between the two traits. The lowest rp between EN1 and EN3 was found in SM strain (rp= 0.101), while it was moderate and significant in LSL, MT strains and MTXLSL and SMXLSL crosses (0.328,0.222, 0.412 and 0.403, respectively). The corresponding values were 0.400, 0.371, -0.419 and 0.059between EN1 and EW3, respectively. Phenotypic correlation between EN1 and EM3 was negative for SM strain (-0.121), while, it was positive and low for MT strain and for both of the two-way crosses. Concerning LSL strain, the rp was positive and high.

The phenotypic correlation coefficients for egg number between the part record of production and annual total production increase progressively from the first period. This result indicated that the estimates of phenotypic correlation coefficients for studied parts of production records were close together in, and they were higher compared to records that were further apart. This was confirmed by results obtained by Kumaraet al. (2004) and Oni et al.(2007).

Generally, the phenotypic correlation coefficient between the annual egg production record and the partial record (1st 90d. of production) was low for developed strains, while, it was high for the commercial one (LSL). This result indicates that these measures are evaluating essentially the same source of genetic variation. These results are in agreement with those reported by Ezzeldin and Mostageer (1984) and Crawford (1990).

CONCLUSION

These results indicate that crossing between LSL and /or Matrouh, Silver Montazah strains improved egg production traits, Mating Silver Montazah sire line with LSL dam line improved egg number and egg mass production at the different studied periods compared to the other cross.

Table (1): Number of males and females of the developed strains and LSL strain and their crosses

Pure strains	Sex	Number
LSL	Females	211
Silver Montazah (SM)	Females	181
	males	50
Matrouh (MT)	Females	140
	males	50
Crossing		
SMXLSL	Females	100
MTXLSL	Females	100

Table (2): Means ± SE of body weight (BWSM) and age (ASM)at sexual maturity For the three pure strains and the two-way crosses

Genotypes	Trait	
	BWSM	**ASM**
LSL	$1418.16^{B}\pm10.23$	$149.65^{C}\pm0.67$
SM	$1550.76^{A}\pm13.0$	$189.88^{A}\pm0.64$
MT	$1456.09^{B}\pm27.7$	$187.41^{AB}\pm0.59$
Overall	1475.00±32.65	175.65±1.08
SMXLSL	$1553.22^{A}\pm44.90$	$186.6^{B}\pm1.83$
MTXLSL	$1479.91^{AB}\pm39.43$	$185.48^{B}\pm0.97$
Overall	1516.57±29.81	186.03±1.018
Significant	**	**

**Means in each column with different litters differ significantly at P<0.01.

Table (3): Means +SE of egg number during the 1st 90d (EN1), the 1st 240 d (EN2) and the 1st 365day (EN3)of laying for the three pure strains and the two-way crosses

Genotypes	Trait		
	EN1	EN2	EN3
LSL	48.66^{A}± 0.63	118.96^{C}±1.33	176.30^{C}±2.49
SM	47.97^{A}± 0.83	129.04^{B}±1.63	155.94^{D}±1.8
MT	41.55^{B}±0.63	98.82^{D}±1.43	108.34^{E}±1.80
Overall	46.06±0.48	115.27±1.05	146.84±1.69
SMXLSL	40.64^{BC}±0.61	151.1^{A}±2.13	198.46^{B}±2.3
MTXLSL	38.1^{C}±0.63	145.48^{A}±1.93	210.48^{A}±2.9
Overall	39.34±0.46	148.24±1.46	204.35±1.89
Significant	**	**	**

**Means in each column with different litters differ significantly at P<0.01

Table (4): Means +SE of egg weight during the 1st 90 (EW1), the 1st 240 d (EW2) and the 1st 365 day (EW3) of laying for the three pure strains and The two-way crosses

Genotypes	Trait		
	EW1	EW2	EW3
LSL	56.14^{A}±0.34	58.17^{A}±0.44	59.22^{A}±0.73
SM	47.53^{C}±0.26	52.24^{C}±0.14	53.43^{B}±0.11
MT	47.19^{C}±0.21	52.75^{C}±0.18	53.31^{B}±0.11
Overall	50.29±0.29	54.91±0.25	55.32±0.31
SMXLSL	52.93^{B}±047	55.74^{B}±0.39	56.23^{A}±0.39
MTXLSL	52.78^{B}±026	55.23^{B}±0.34	56.28^{A}±0.31
Overall	52.86±0.27	55.48±0.26	56.25±0.25
Significant	**	**	**

**Means in each column with different litters differ significantly at P<0.01

Table (5): Means +SE of egg mass during the 1st 90 (EM1), the 1st 240 d (EM2) and the 1st 365 day (EM3) of laying for the three pure strains and the two-way crosses

Genotypes	Traits		
	EM1	EM2	EM3
LSL	2737.42^{A}±18.0	6935.27^{C}±78.39	10445.93^{C}±128.67
SM	2283.63^{B}±42.6	6743.40^{C}±8861	8328.13^{D}±94.11
MT	1952.18^{D}±24.79	5212.41^{D}±84.89	5776.89^{E}±97.35
Overall	2469.79±29.71	6665.73±58.55	8968.32±103.89
SMXLSL	2148.86^{BC}±34.77	8432.30^{A}±146.51	11830.34^{A}±175.20
MTXLSL	2009.19^{DC}±3391	8037.27^{B}±124.54	11165.92^{B}±128.93
Overall	2077.66±25.13	8230.91±97.38	11491.62±112.57
Significant	**	**	**

**Means in each column with different litters differ significantly at P<0.01

Table (6): Heterosis percentage of some egg production traits for the two-way crosses

Genotypes	SMXLSL	MTXLSL
BWSM	4.55	2.77
ASM	9.91	10.05
EN1	-15.89	-15.54
EN2	21.85	33.6
EN3	26.41	39.45
EW1	2.1	2.15
EW2	0.96	-0.41
EW3	-020	0.04
EM1	-14.41	-14.31
EM2	23.29	32.33
EM3	26.03	37.66

Table (7): Estimates of phenotypic correlation coefficients between egg number during the1st 90 day of laying, body weight (BWSM), age(ASM), at sexual maturity annual egg number(EN3), egg weight (EW3)and egg mass production (EM3) in the different studied genotypes

Genotypes	BWSM	ASM	EN3	EW3	EM3
LSL	0.287*	-0.333*	0.328*	0.40*	0.611*
SM	0.026ns	-0.163*	0.101ns	-0.065 ns	-0.121 ns
MT	0.107ns	0.049*	0.222 ns	0.371 ns	0.264 ns
SMXLSL	0.261 *	-0326*	0.403 ns	0.059 *	0.421 ns
MTXLSL	-0.207 ns	-0085*	0.413*	-0.419 ns	0.253 ns

*significantly at P<0.05, ns:non significant.

REFERENCES

Abou El-Ghar, R.Sh.;Ghanem,Hanan H. and Aly, O.M., 2010. Genetic improvement of egg production from crossing two developed strains with a commercial laying hens. Egypt. Poult.Sci.30:457-472.

Abou El-Ghar, R.Sh., Aly O.M. and Ghanem, Hanan H., 2011. Test of epistasis among triple crosses of Matrouh with different strains of chickens. Egypt. Poult. Sci. Vol (31) (I): 29-38.

Abou El-Ghar, R.Sh.;Ghanem, Hanan H.;Shalan,Hedaia M. and Aly O.M., 2012. Heterosis from crossing some local strains with two commercial lines of laying hens. Egypt. Poult. Sci. Vol (32) (III): 515-529.

Aly, O.M; Abou El-Ghar, R.S.;Abou El-Ella Nazla. Y.;and Aly, W.Z.;2005. Using potency Ratio to interpret hybrid vigor in crossing between two local strains of chickens. Egypt. Poult. Sci. 25: 413-428**.**

Amin, E.M.; 2008. Effect of crossing between native and a commercial Chicken strain on egg production traits. Egypt. Poult. Sci. 28: 327-349.

Amuzu-Aweh, E.N.;Bovenhuis, H.; Drik-Jan de Koning and Bijma, P.,2015. Perdictingheterosis for egg production traits in crossbred offspring of individual White Leghorn sires using genome-wide SNP data. Genetics Selection Evolation.27:47.

Bahieeldeen, M. M.;ElTahawy, W. S., Attia, Y. A. andMeky, M. A.,2009.Inheritance of age at sexual maturity and its relationship with some productive traits of Japanese quails.Egypt.Poult.Sci. J. 28:1217-1232.

Crawford, R.D.,1990. Poultry Breeding and Genetics.Development in Animaland Vet. Sci. Elsevier Sci. Pub., B.V. Amsterdam, Oxford.

Duncan, D.B. (1955). Multiple range and multiple F test. Biometrics.11:1-42.

El-Tahawy, W.S.; 2000.Genetically improvement of some Productive and reproductive traits in local chicken. M. Sc. Thesis, Fac. of Agric. Alex. UnivEgypt .

Ezzeldin, Z.A.; and Mostageer,A., 1984. Genetic and phenotypic correlation between the annual egg production and different part record in Fayoumi. Egypt. J. Anim. Prod.24(1-2):69-78.

Fairfull, R.W.; Gowe R.S.; and Nagai, J.A., 1985. Heterosis in White Leghorn strain crosses. Proc. Brit. Poult .Breeders Roundtable (Edinburgh).

Fairfull, R.W.; Gowe, R.S.;and Nagai J. 1987. Dominance and epistasis in heterosis of White Leghorn strain crosses. Can. J. Anim.Sci. 67:663-680.

Fairfull, R. W.,1990.Heterosis.Pages 913–933 in: PoultryBreeding and Genetics. R. D. Crawford, ed. Elsevier Science Publishers B.V.,Amsterdam, The Netherlands.

Falconer, D.S.; and Mackay,T.F.C., 1996. Introduction to quantitative genetics. 4th ed. Longman, New York.

Ghanem, Hanan H.; Aly, O.M. and Abou El-Ghar, R. Sh.,2008. Matrouh as a common parent in crossing with some local strains of chickens: II-Heterosis, additive and maternal effects on some egg production traits. Egypt. Poult. Sci. 28:205-222.

Ghanem, Hanan H.; El-Tahawy, W.S.; Attia, Y.A. and Nawar, A.N., 2012. Developing A 3-way cross of chickens to improve egg production traits. Egypt. Sci. 35:547-560.

Ghanem, H. Hanan; Aly O.M.; Abou El-Ghar R. Sh. and ShalanHedaia I., 2013. Effect of bottom grading program for Lohman Brown (LB) and Lohman Selected Leghorn (LSL) crosses with some developed local strains on some egg production traits. Egypt. Poult. Sci. Vol (33) (I): 29-49.

Hanafi, M.S. and Iraqi, M.M., 2001. Evaluation of purebredsheterosis, combining abilities, maternal and sex linked effects for some production and reproduction traits in chickens. Second International Conference on Animal Production and Health in Semi-Arid Areas,4-6Sep., Organized by Faculty of Environmental Agricultural Sciences, Suze Canal Univ., El-Arish-North Sinai, Egypt, pages: 545-555.

Iraqi , M.M., 2008. Estimation of crossbreeding effects for egg production traits in a crossbreeding experiment involving two local strains of chickens.Egypt.Poult. Sci. 28:867-882.

Iraqi, M.M.; Khalil, M.H. and El-Attrouny, M.M., 2012. Estimation of cross breeding parameters of egg production traits in crossing Golden Montazah with White Leghorn chickens. Livestock Research for Rural Development 24(4): 2012.

Khalil, M.K.; Al-Homidan, A.H. and Hermes, I.H., 2004.crossbreeding components in age at first egg and egg production for crossing Saudia chickens with White Leghorn. Livestock Research for Rural Development 16 (1)127-132 http://www.lrrd.org/lrrd16/1/khal161.htm

Khawaja, T.; SohailH.Khan; Mukhtar, N.;Parveen, A; and Fareed, G., 2013a. Production performance, egg quality and biochemical parameters of three way crossbred chickens with reciprocal in sub-tropical. Italian Journal of Animal Science.Vol(12):208-216. http://www.tandfonline.com/doi/abs/10.4081/ijas.2013.e21

Khawaja, T.; Sohail, H.Khan; Mukhtar,N., Ullah, N., and Parveen. A. 2013b. Production performance, egg quality and biochemical parametersofFayomi, Rhode Island Red and their reciprocal crossbred chickens. Journal of Applied Animal Research Vol (41).http://www.tandfonline.com/doi/abs/10.1080/09712119.2012.739969

Kumaer, G.G.;Reddy, P.M.;Gupta, P.R.; and Pkaharaj, N.K., 2004. Relative efficiency of selection based on segments of the part record to improve annual egg production in White Leghorns. Indian Journal of Poult. Sci. 39:224-228.

Mahmoud,T.H;MadkourY.H.;SayedI. F.andHarirahK.M.,1974a. Matrouh a new breed of chickens. Agric. Res. Rev., Cairo 52:87-96.

Mahmoud, T.H; Sayed, I. F. and Madkour, Y.H., 1974b. The Silver Montazah a new variety of chickens. Agric. Res. Rev., Cairo 52:97-105.

Nawar, M.E., and F.H. Abdou, F.A., 1999.Analysis of heterotic gene action and maternal effects in crossbred Fayoumi chickens.Egypt Poult. Sci. 19 (III): 671-689.**Oni, O.O.; Abubakar, B. Y.; Dim, N.I.; Asiribo, O.E and Adeyinka, L.A., 2007.** Genetic and phenotypic relationships between Mcnally model parameters and egg production traits. Inter. Jour., of poultry science 6 (1): 8-12.

SAS Institute, 2000. SAS User's Guide: SAS Institute Inc., Cary, N C.

Sheridan A.K., 1986. Selection for heterosis from crossbred population: Estimation of the F1 heterosis and its mode of inheritance. British Poultry Science 24:541-550.

Waleed, M.R; and AIShaheen, Sajida, A.L.,2011. Use of full diallel cross to estimate crossbreeding effects on laying chickens. International Jour. of Poult. Sci. 3: 197-204.

Wei, M.; and Vander Werf, J.H., 1994. Maximizing genetic response in crossbreeds using both purebred and crossbred information. Anim. Prod. 59:40.

Willham, R.l.; and Pollak E., 1985. Theory of heterosis. Journal of Dairy Science 68:2411-2417.

crossing - egg production traits – heterosis - correlation.

الملخص العربى

تأثير الخلط بين سلاله اللجهورن المنتخب و سلالتين مستنبطتين من الدجاج على تحسين بعض صفات انتاج البيض

أحمد عبد المنعم دعبس

معهد بحوث الانتاج الحيوانى- مركز البحوث الزراعيه- وزارة الزراعه-مصر

الهدف من هذه الدراسه هى تحسين صفات إنتاج البيض لسلالتين محليتين من الدجاج بواسطه الخلط. لقد تم استخدام سلالتين مستنبطتين هما المنتزه الفضى و مطروح كخطوط أبويه و سلاله تجاريه هى LSL كخط اموى لإنتاج خمس تراكيب وراثيه،ثلاثه نراكيب نقيه و خليط ثنائى هو المنتزه الفضى LSL Xو خليط ثنائى آخر (مطروحXLSL).

تم تقدير عمر ووزن البلوغ الجنسى فرديا و كذلك عدد و وزن البيض وتم حساب كتلةالبيض فى ثلاث فترات مختلفة لانتاج البيض. تم تقدير قوة الهجين للصفات المدروسه و تقدير الارتباط الظاهرى بين عدد البيض خلال ال90 يوم الاولى من الإنتاج و بعض صفات إنتاج البيض و كانت اهم النتائج:

1- وجد ان السلالات النقيه بلغت مبكرا (175.65يوم) مقارنه بالخليط الثنائى(186.03 يوم) بينما لم نجد اختلافات معنويه لصفه وزن الجسم عند البلوغ بين السلالات النقيه و الخليط الثنائى.

2- لقد سجل الخليط الثنائى المنتزه الفضى LSL X عدد و كتله بيض أعلى معنويا مقارنه بالخليط الثنائى مطروح LSL X خلال فترات إنتاج البيض المختلفه.

3- كانت قوة الهجين لعمر و وزن البلوغ الجنسى عاليه و موجبه للخليط الثنائى المنتزه الفضىLSL X (4.55%) ، (9.52%) على التوالى بينما كانت 2.98%، 4.35% للخليط مطروحLSL Xعلى التوالى. وقد وجد أن قوه الهجين سالبه (-15.89%، -15.54%) لعدد البيض خلال ال90 يوم الاولى لكلا الخليطين على التوالى.

4- وجد أن قوة الهجين لصفة كتلة البيض عاليه و معنويه فى كلا الخليطين المنتزه الفضى LSL Xو مطروح LSL X خلال الفترتين الأخيرتين من انتاج البيض بينما كانت سالبه فى الفترة الأولى لإنتاج البيض لكلا الخليطين. هذه النتائج تدل على أن الخليط الثنائى أدى إلى تحسين إنتاج البيض السنوى بمقدار 26.03% و 36.66% لكلا الخليطين على التوالى.

5- الارتباط الظاهرى بين إنتاج البيض السنوى و إنتاج البيض الجزئى كان منخفضا فى السلالات المستنبطه بينما كان مرتفعا فى السلاله التجاريه LSL و كذلك فى الخليط الثنائى.

هذه النتائج تدل على ان الخلط بين سلاله LSL و كلا من سلالتى مطروح و المنتزه الفضى أدى إلى تحسين انتاج البيض.

و وجد ان تزاوج المنتزه الفضى كخط اباء معLSL كخط أمهات يؤدى إلى تحسين وزن و كتله البيض فى مختلف الفترات تحت الدراسه مقارنه بالخليط الاخر.