Productive Performance of Nine Quail Genotypes Resulted from Full Diallel Crossing

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Abstract

A total of 1296 one day old chicks of nine genotypes of quail were used in this experiment. The chicks were hatched and reared at the Poultry Farm of Animal Production Department, College of Agriculture, University of Duhok, Kurdistan region-Iraq. The studied genotypes were resulted of three quail lines (White-W, Light brown-Lb and Dark brown-Db) using full diallel cross design. This research was conducted to investigate the productive performance of nine quail genotypes resulted from full diallel cross design. The characters were: live body weight (BW), body weight gain (WG), feed intake (FI), feed conversion ratio (FCR), egg weight (EW), egg number (EN), egg mass (EM), mortality rate (MR%), fertility (*F%*) and hatchability (H%). The results follow: BWs showed significant differences ($p<0.01$) among the studied genotypes and between both sexes in BWs. Pooled WG, pooled FI and FCR for both growth and laying periods didn't differ significantly among the studied genotypes ($p>0.05$). Egg weight among the studied genotypes differ significantly just at the first week of laying ($p<0.05$), which may due to the variation among BWs of the studied genotypes. The cross W*Db recorded significantly ($p<0.01$) the lowest mortality rate (4.7 %); while the reciprocal cross Db*W recorded the highest rate (19.3 %). The highest fertility percentage (91.7 %) was achieved by DbDb genotype; while the highest hatchability percentage (92.6 %) was achieved by LbLb genotype. As conclusion, it may use W quail line as sire and Db line as dam, with possibility to alternative with Lb line (as dam with W line or as sire with Db line) in mating system to achieve the best productive performance.

Key words: Quail, full diallel cross, productive performance, fertility and hatchability.

Introduction:

Quail birds consider valuable resources for both meat and eggs (Murakami and Ariki, 1998). The purpose of crossing is to combine different valuable breeds (Mekky *et. al.*, 2008). Mahipal *et al.*, (2001) used a diallel cross in three quail lines B, H and M, for production traits, and showed that all crosses significantly differed for body weight, and the cross M x B emerged as the best commercial cross with the highest growth rate and egg production; they added that the crosses surpassed significantly their parents for age at first egg, egg number and egg weight, the same authors concluded that the crosses (BxH) and reciprocal crosses (HxB) recorded significantly ($P<0.05$) the highest averages of both fertility and hatchability (95.5% and 70.9 %, respectively) than their pure lines. Piao *et al.*, (2004) studied two quail lines and its crosses, which were very small line (SS), random bred population (RR) and their crosses (SR). They concluded that the differences in body weight among three groups were highly significant (*P<0.01*), and the RR quails were heavier than SS birds. They mentioned wide differences between the genetic groups in the average egg weight; where the egg weight of SR, was smaller than that of the RR; they also showed that the fertility % in SR eggs was significantly lower than that of the pure line RR eggs. On the contrary, the hatchability % of the SR quail eggs was higher than that of both RR and SS pure lines eggs. Vali, (2009) studied the mortality rate up to 49 days of age in two strains of quail (CO: Coturnix japonica and Ra: Range quail Coturnix ypsilophorus), he found that the mortality rate didn't differ significantly (*P>0.05*) between both studied groups; and also there was insignificant effect of reciprocal cross on the mortality rate. Daily feed intake and feed conversion ratio at 35 and 42 days old were significant between the crosses of different quail lines, the same trend was true for average egg weight, but there were insignificant effect of crosses and reciprocal crosses on weekly egg number, where the highest coefficient of variation (CV%) was recorded 8.31 % (Drumond *et. al.*, 2015).

Material And Methods:

A total of 1296 one day old chicks of nine quail genotypes were used in this experiment. The chicks were hatched and reared at the Poultry Farm of Animal Production Department, College of Agriculture, University of Duhok, Kurdistan region-Iraq. The studied genotypes were resulted from three quail lines (White-**W**, Light brown-**L** and Dark brown-**D**) using full diallel cross design, as illustrated in Table 1:

Table 1. The studied nine genotypes as obtained from the three quail lines.

Male / **Female**	**W**	**L**	**D**
W	WW	WL	WD
L	LW	LB	LD
D	DW	DL	DD

This research was conducted to investigate the productive performance of nine quail genotypes resulted from full diallel cross design.

Environment and feeding:

The unsexed one-day chicks of nine quail genotypes were distributed equally and randomly on cages having dimensions of (85X85X85 cm.) with two replicates (72 birds/replicate) within each genotype during the first stage (up to 35 d), then the sexed birds were redistributed to nine families (8 males with 15 females, for each) with two replicates within each cross, up to 57 days old. The birds were supplied with metal feeders and plastic drinkers. The house and the equipment were thoroughly washed and disinfected.

The environment conditions (temperature and relative humidity) were as shown in Figure. (1). Light program included 23 hours/day for the first week of age, then modified to be 15 hours/day from the second week old until the end of trial. Feed was offered *ad libitum* manually, which included three rations (Table 2); starter (2850 K. cal. ME/ kg & 26 % CP) from (0-4) weeks old, grower (2850 K. cal. ME/ kg & 21% CP) from (4-6) weeks old and layer or breeder (2737 K. cal. ME/kg & 15.7% CP) from 6 weeks old-end of the trial, respectively, according to Lesson and Summers (2005).

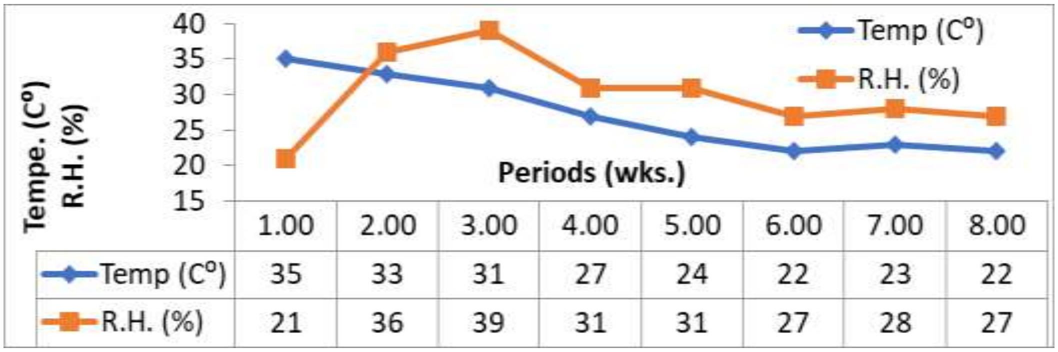

Figure 1. Temperature (C°) and relative humidity (%) during the trial periods (wks.)

Table 2. Rations and its chemical composition which were offered to the quail chicks, during the experimental periods.

Ingredients %	**Starter (0-4 wks.)**	**Grower (4-6 wks.)**	**Breeder (6 wks.-end trial)**
Yellow corn	40	50	60
Soybean meal 44%	50	35	22
Wheat bran	3.4	7.2	4.7
Vegetable oil	4	3.5	2
Limestone	1.5	3	9
Di-calcium phosphate	0.8	1	2
Salt (Nacl)	0.2	0.2	0.2
Vitamins and Minerals	0.1	0.1	0.1
Total	100	100	100
Chemical composition			
K. cal. ME / Kg diet	2850	2850	2737
Crude Protein %	26	21	15.7
C/P ratio	109.6	135.7	174.3
Standard C/P ratio	110	140	175
Ca^{++}	0.9	1.48	3.93
P	0.63	0.64	0.74

The Studied Traits:

1- Live body weight and body weight gain:

Quail body weight (BW) of chicks for each replicate within each genotype (line or cross) were weighed (gm.) weekly and individually from 0 up to 6 weeks of age, using a sensitive digital balance (accuracy up to 1 gm.).

The body weight gain (BWG) was calculated by using the following equation:

BWG (gm.) = BW (at the second week) – BW (at the first week)

2- Feed intake and Feed Conversion Ratio:

Feed intake for both growing and laying periods (FI) in each cage was recorded weekly (by gm.) and the feed conversion ratio (FCR) was calculated using the following two equations:

1- For growing period:

FCR = (Feed intake during certain period) / weight gain during the same period

2- For laying period:

FCR = (Feed intake during certain period) / egg mass during the same period

3- Sexual maturity:

The sexual maturity age of quail birds in all genotype was determined by the age of quail in which the egg production percentage of each genotype was reached 50%.

4- Egg Production:

The egg weight (gm.) and egg numbers (collected eggs) were recorded daily, since the first day of sexual maturity, the egg mass (EM) was computed for each genotype according to the following equation:

EM (gm.) = Egg number (in certain period) * Average egg weight (in the same period)

Statistical analysis:

The experiment was designed as diallel cross within completely randomized design (CRD), and the collected data was analysed using SAS software-9.1 (SAS, 2010) via the following two models:

$$Y_{ijk} = \mu + G_i + R_j + e_{ijk} \qquad \text{(Model 1)}$$

Where: Y_{ijk}: The observations of the studied trait; μ: Overall mean; G_i: The fixed effect of genotype; R_j: The effect of replication (lot); e_{ijk}: Random error; $_i$: Genotype; $_j$: Replication (lot); $_k$: Individual (bird). This model was used to analyse all data in all ages except the ages of 6 and 7 weeks old, where the model 2 was applied as follow:

$$Y_{ijkl} = \mu + G_i + S_j + R_k + e_{ijkl} \quad \text{(Model 2)}$$

Where S_j: The effect of sex.

The differences between the means were analysed using Duncan multiple range test (Duncan, 1955).

Results AND Discussion

I- Growth traits:

Body weight:

The quail birds showed generally high significant differences among the studied genotypes (*p<0.01*) for body weight (BW) at all growth ages (Table 3). This means that there is no homogeneity in live body weight trait of quail's genotype resulted from the crossing system. The heaviest BW was recorded for the cross (Lb*Db) with value of (135.69 gm.) at 4 weeks old.

However, at one day old, the highest BW was recorded for the purebred dark brown (Db) genotype (7.5 gm.), while the lowest BW was observed for the cross (Lb*Db) with value of (6.85 gm.). At one week old, the quail chicks appeared to give the highest BW for the cross W*Db (28.93 gm.), while its reciprocal cross (Db*W) resulted in the lowest value (25.21 gm.). Moreover, at 2 week of age, the cross (W*Lb) recorded the highest BW (63 gm.), while the lowest BW was recorded for its reciprocal cross (Lb*W) which was (54.03 gm.). At 3 weeks of age, the cross (W*Db) recorded the heaviest BW (104.66gm.), but the lowest BW was observed for the reciprocal (Lb*W) with value of (95.91 gm.). These results indicate that generally the crosses resulted in better BW than their reciprocal crosses and parental lines, which may due to the hybrid vigour related to the crosses. These findings are in agreement with that reported by Mohammed *et al*., (2006) and Varkoohi *et al*. (2010), who had noticed significant differences in BW among different strains of quail at different ages. In contrast to these findings, Moritsu *et al*. (1997) and Baik and Marks (1993), found that crossing lines for BW at 4 weeks old resulted in a crosses with a little lower BW than the average weight of their parental lines. Also, Chahil *et al*. (1975), Okamoto *et al*. (1982) and Gerken *et al*. (1988), reported that the parental lines were not much different in body weight than its crosses.

The effect of genotype, sex and their interaction on BW at both 6 and 7 weeks old, are shown in Table (4). Generally, the effect of genotype on BW at both 6 and 7 weeks old of laying period, was insignificant ($p>0.05$); but, It could be noticed from the mentioned table that, the BW trait for all studied genotypes were ranged from 156.8 to 171.2 and from 182.4 to 192.8 gm., at 6 and 7 weeks old, respectively.

Table 3. Effect of quail's genotype on the body weight trait (gm.) at growth periods (mean ± SE).

Age (wk.) Genotype		no.	0	1	2	3	4
Pure bred	W*W	120	7.25±0.9^{ab}	27.88±0.4^{ab}	61.09±0.95^{ab}	100.61±1.12^{bc}	135.24±1^{a}
	Lb*Lb	142	7.2±0.08^{b}	26.72±0.37^{bc}	60.03±0.75^{b}	97.94±0.98^{dc}	134.04±1.05^{a}
	Db*Db	56	7.5±0.11^{a}	26.42±0.64^{dc}	61.55±1.04^{ab}	100.04±1.38^{bc}	135.06±1.45^{a}
Crosses	W*Lb	139	7.32±0.08^{ab}	26.85±0.44^{bc}	63±0.61^{a}	101.96±0.91^{ab}	135.07±1.53^{a}
	W*Db	107	7.29±0.09^{ab}	28.93±0.46^{a}	62.81±0.75^{a}	104.66±1.6^{a}	134.34±1.2^{a}
	Lb*Db	113	6.85±0.09^{c}	26.81±0.5^{bc}	61.77±1.001^{ab}	103.76±1.27^{ab}	135.69±1.5^{a}
Reciprocal	Lb*W	148	7.4±0.07^{ab}	25.72±0.31^{dc}	54.03±0.67^{c}	95.91±0.95^{d}	134.23±1.09^{a}
	Db*W	103	7.3±0.09^{ab}	25.21±0.5^{d}	60.91±0.97^{ab}	100.14±1.4^{bc}	132.28±1.35^{a}
	Db*Lb	138	7.3±0.08ab	26.29±0.5^{dc}	59.89±0.9b	97.44±1.25cd	128.41±1.27^{b}
	Sig.		**	**	**	**	**

***=significant at ($p<0.05$); **=highly significant ($p<0.01$).**

While, the effect of sex was highly significant ($p<0.01$), where females recorded higher BW than males (198.2 vs. 161.2 gm.) at 7 weeks of age. The interaction between genotype and sex was insignificant ($p>0.05$).

Table 4. Effect of genotype, sex and their interaction on body weight (gm.) at laying periods (mean ± SE).

Period (wks.) Genotype	6			7		
	Male	**Female**	**Overall mean**	**M**	**F**	**Overall Mean**
W*W	145.3±2.1	174±2.5	166.18 ± 2.7	162.67±2.7	198.2±2.87	188.5 ± 3.3
Lb*Lb	146.5±2.6	175.69±2.6	167.7 ± 2.8	161.67±3.5	202.1±3.9	191.05 ± 4.03
Db*Db	143.83±3.04	164.94±2.4	159.18 ± 2.4	162.17±4.06	192.94±2.7	184.6 ± 3.04
W*Lb	153.17±2.95	177.94±2.45	171.18 ± 2.6	162.17±2.3	198.97±3.5	182.39 ± 3.2
W*Db	145.8±1.9	173.31±2.39	156.82 ± 2.6	166.8±5.1	202.56±2.8	192.82 ± 3.5
Lb*Db	143.17±1.6	177.38±3.8	168.04 ± 3.6	156.3±3.84	205.5±2.9	192.1 ± 4.1
Lb*W	146.3±2.04	172.38±1.8	165.3 ± 2.3	159.17±2.7	196.31±2.95	186.18 ± 3.4
Db*Lb	142.83±1.9	171.81±2.14	163.9 ± 2.5	161.8±4.9	199.1±3.02	188.9 ± 3.6
Db*W	144.67±2.3	174.63±2.8	166.45 ± 2.9	157.75±4.1	197.56±4	186.7 ± 4.1
Overall mean (Sex)	145.74± 0.8[b]	173.56 ± 0.9 [a]		161.18 ± 1.3 [b]	198.24 ± 1.1[a]	
Sig.	(Genotype) / Sex / Interaction (Gen. * Sex) Ns / ** / Ns			(Genotype) / Sex / Interaction (Gen.* Sex) Ns / ** / Ns		

Ns = Non-significant; *=significant at ($p<0.05$); **=highly significant ($p<0.01$).

The present results are in agreements with findings that reported by Moritsu *et al*., (1997) and Baik and Marks (1993), whose found insignificant differences in different line and their crosses for body weight trait.

Weight gain:

Figure (1) illustrates weight gain trait (gm) during growth periods (0-5 weeks old) in all genotypes. The results showed that there were no significant differences ($p>0.05$) among pooled gain of genotypes at different growth periods. However the weight gain increases from 0 day up to 3 weeks of age for all genotypes, then it decreases during the next periods (3-4 weeks old) in all genotypes, and then it's re-increased at the period of 4-5 weeks old for all genotypes except (Db*Lb and Lb*W) genotypes, which continue decreasing.

4.2.1.4

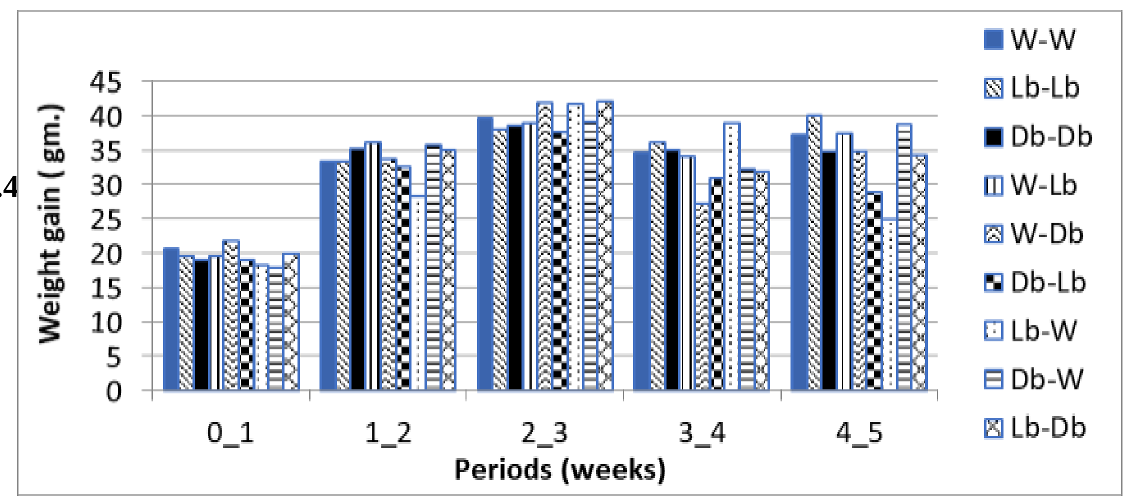

Figure 1. Body weight gain (gm.) during the growth periods (wks.).

It could be concluded from this figure, that the highest gain was obtained by (Lb*Db) genotype with value of (42.04 gm) at the growth period (2-3 week), while the lowest gain was recorded by (Db*W) genotype with value of (17.88 gm.) during the period (0-1 week). These results are in agreement with the finding that reported by Moritsu *et al*., (1997) and disagreement with the results that mentioned by Mohammed *et al*., (2006).

Feed intake:

Figure (2) illustrates results of feed intake (gm. /week) at growth periods in all studied genotypes. The results showed that there were no significant differences for pooled quantity of consumed feed among studied genotypes. However, the cross (W*Db) genotype and reciprocal cross (Lb*W) genotype consumed the highest (565.2 gm.) and lowest (463.5 gm.) accumulative feed quantity, respectively; than other genotypes at all studied periods, However, Khaldari *et al*., (2010) was reported higher feed intake in the lines selected for higher body weight as compared to non-selected birds in quail, Moreover, they confirm that feed intake per gram body weight was lower than those of control line.

Feed conversion ratio:

As it is known FCR related to both weight gain and feed intake, so any increasing in feed quantity or decreasing gain will resulted in higher FCR. So, the results represented in Figure (3) illustrates the fluctuation in FCR values.

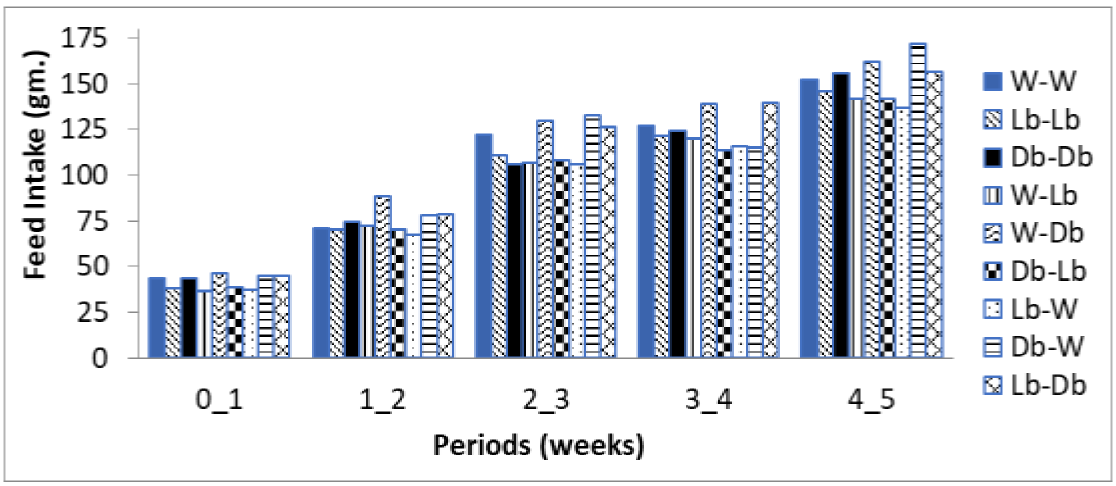

Figure 2. Feed intake (gm.) during the growth periods (wks.).

However, and from statistical point of view, there are insignificant differences among the studied genotypes at studied periods ($p>0.05$). Generally the cross (W*Db) recorded the highest FCR (3.5) while the reciprocal cross (W*Lb) was recorded the best FCR (2.8) during the growth period (0-5 weeks old). In contrast to this result Knizetova, (1996) was found that the selection for live weight at 4 weeks of age was improved feed efficiency (WG: FI). He added that, significant differences were observed in feed conversion ratio among different generations and selection methods; Improved FCR (2.30) in generation 2 as compared to generation 0 (2.35) might be attributed to birds having higher body weight in adjustment to increased feed intake in progressive generations which resulted in improved FCR. Also, the finding which reported by (Khaldari *et al*., 2010) was disagreement with the present result.

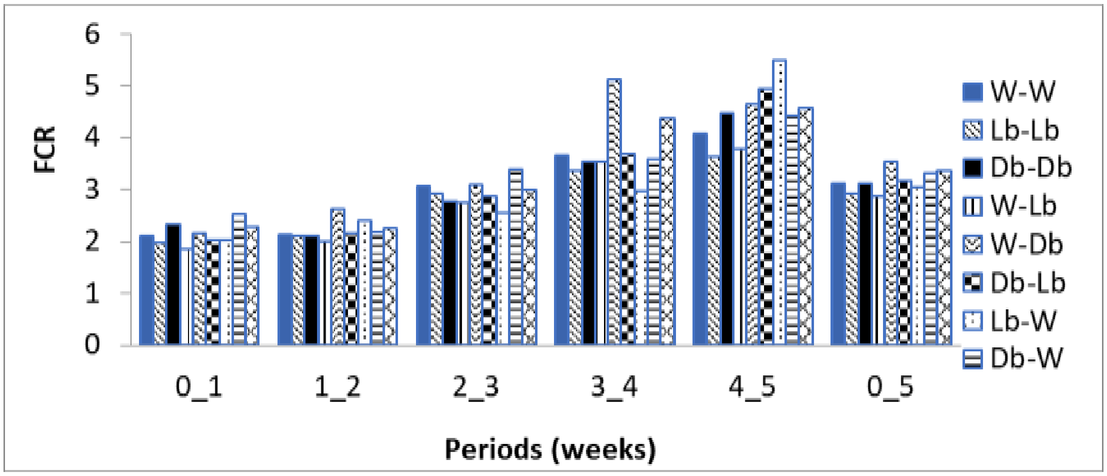

Figure 3. Feed conversion ratio during the growth period.

II- Egg production traits:

Egg characters:

The results of egg characteristics are present in Table (5). It could be noticed that there are insignificant differences among studied genotypes for all characters except egg weight at first studied week (EWW1), where the pure genotype (Db*Db) was recorded the lowest egg weight (9.63 gm.) and the cross (W*Db) recorded the highest one (10.2 gm.). However, and generally the crosses resulted in better egg weight than pure genotypes and reciprocal crosses. This result confirms that, the cross give better result than the pure genotype in productive traits. Regarding to the age at sexual maturity, it is ranged from 39.5 – 42.5 days. The earlier age was recorded for pure genotype (W*W), while the latest age was recorded for the pure genotype (Db*Db), and all other genotypes were recorded the intermediate ages at sexual maturity.

In respect to the egg number and egg mass, the highest numbers of eggs were recorded in the second week of study for the cross (W*Db) with value of (5.8 eggs); and also, the highest egg mass was calculated for the same cross genotype at the same week with value of (62.6 gm.). These results are disagreement with the findings that reported by Mahipal *et al.*, (2001) in age at sexual maturity and egg number characters; while the findings which reported by Piao *et al.*, (2004) were in agreement with the present results in egg weight character.

Table 5. Effect of quail's genotype on the age at sexual maturity and egg production characters (for 2 weeks after maturation).

	Trait / Genotype (n=30)	Age at sexual maturity (days)	Egg weight		Egg number		Egg mass	
		ASM	EWW1	EWW2	ENW1	ENW2	EMW1	EMW2
Pure	W*W	39.5±1.5	9.89±0.14[ab]	10.37±0.13	4.23±1.01	4.9±1.1	51.58±5.99	59.37±4.1
	Lb*Lb	42±1.00	9.66±0.16[b]	10.18±0.13	3.8±0.3	3.9±0.05	37.15±1.8	39.26±0.65
	Db*Db	42.5±0.5	9.63±0.1[b]	10.22±0.1	4.5±0.45	5.6±0.25	42.92±4.12	56.88±1.8
Crosses	W*Lb	41.5±1.5	10.2±0.2[ab]	10.33±0.17	3.8±0.3	4.35±0.6	38.39±1.9	44.89±4.6
	W*Db	41±1.00	10.2±0.13[a]	10.53±0.17	5.1±0.5	5.8±0.2	53.6±3.5	62.6±1.00
	Lb*Db	41±2.00	9.91±0.1[ab]	10.47±0.15	4.8±0.4	5.3±0.2	47.59±3.5	55.44±3.4
Reciprocal crosses	Lb*W	42±00	9.97±0.21[ab]	10.43±0.17	4.8±1.4	4.7±1.00	47.39±1.37	49.27±1.16
	Db*Lb	40.5±1.5	9.79±0.1[ab]	10.39±0.14	4.1±1.8	4.6±1.5	40.3±1.53	47.99±1.68
	Db*W	41.5±1.5	9.97±0.2[ab]	10.63±0.2	3.8±0.5	4.6±0.6	37.95±4.6	48.9±5.7
	Sig.	**Ns**	*****	**Ns**	**Ns**	**Ns**	**Ns**	**Ns**

EWW1= Egg weight at the first week of production after maturation completion; EWW2=Egg weight at the second week of production after maturation completion; ENW1= Egg number at the first week of production after maturation completion; ENW2 = Egg number at the second week of production after maturation completion; EMW1 = Egg mass during the first week of production after maturation completion; EMW2 = Egg mass during the second week of production after maturation completion; Ns = non-significant; *=significant at (P<0.05); **=highly significant (P<0.01). Values= (means ± SE).

Feed intake:

The results represented in figure (4), illustrates the feed intake which increases from seventh week old to eighth week old in the progeny genotypes. Generally there were insignificant differences (*p>0.05*) among genotypes for both studied weeks. However, the cross (Lb*Db) at seventh and eighth weeks of age was consumed the highest quantities of feed (207.29 and 257gm, respectively). While its reciprocal cross (Db*Lb) was consumed the lowest quantities of feed at seventh and eighth week old (187.35gm. and 231.5gm., respectively). This result may reflect the negative effect of reciprocal cross on the feed intake within brown line. The present result disagreement with the finding that mentioned by Vali, (2009) who concluded that the feed intake in reciprocal crosses of two quail strains differed significantly.

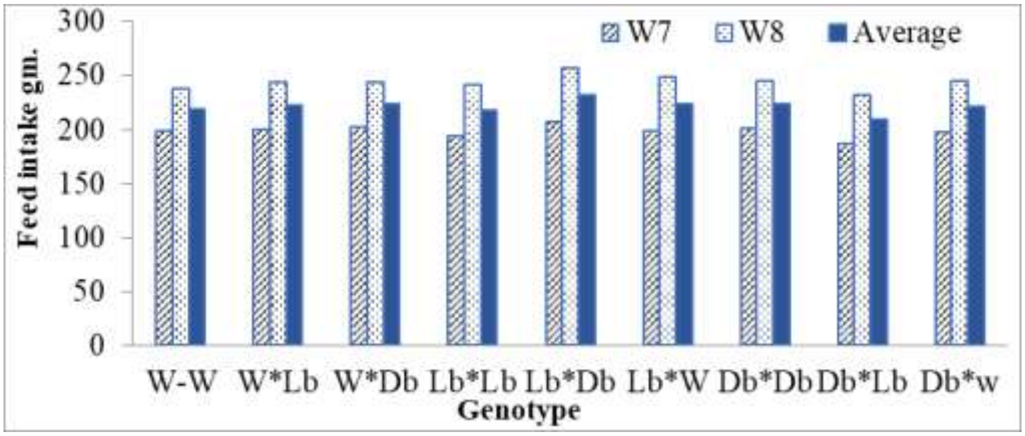

Figure 4. Feed intake (gm.) during the laying periods from (6-7 and 7-8 wks.) and its average in quail genotypes.

Feed conversion ratio:

Feed conversion ratios for studied genotypes at first two weeks after maturation are represented in Figure (5). Statistical analysis shows that there were insignificant differences among studied genotypes. It could be noticed that the best (lowest) FCRs were calculated for the cross (W*Db) with values of 3.3 and 3.8 at 6-7 and 7-8 weeks old, respectively; while the highest FCRs were calculated for the pure genotype (Lb*Lb) with values of 5.7 and 6.5 at the same previous periods, respectively.

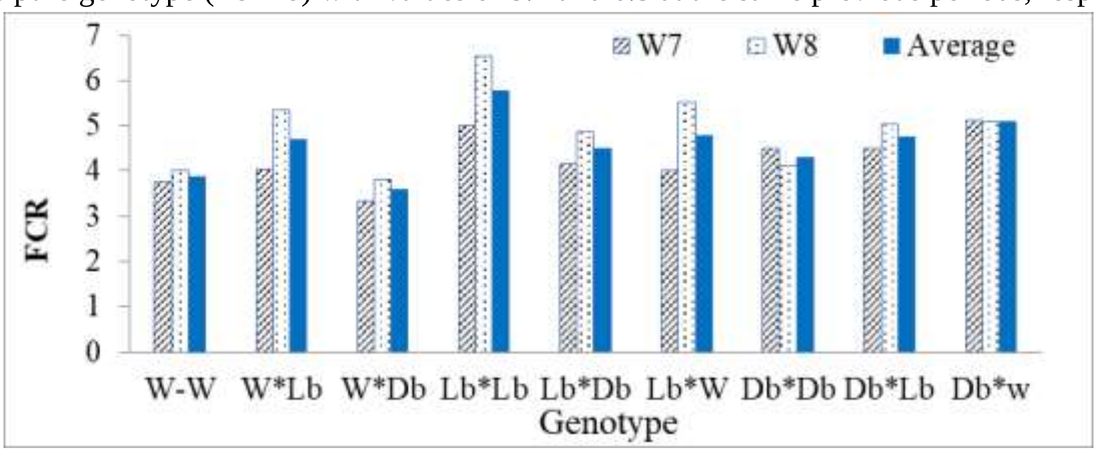

Figure 5. Feed conversion ratio (FCR) during the laying periods of (6-7 and 7-8 wks.) and its average in quail genotypes.

The causes that reflect such results are due to the lowest egg mass for the pure genotype (Lb*Lb) compared to the cross (W*Db) which was recorded the highest egg mass. The last cross was surpassed the pure genotype (Lb*Lb) at both previous periods for mass of eggs by about 31.6 % and 37.3 %, respectively. All other genotypes were recorded intermediate values of FCRs between both mentioned genotypes. However the present results were disagreement with the findings that reported by Drumond *et al.*, (2015) who found significant differences among different strains of quail for FCR.

Mortality rate (%):

As shown in Figure (6), the mortality rates differed significantly (*$p<0.01$*). The highest mortality percentage during the whole experimental period and within all genotypes was recorded for the reciprocal cross DbW (19.3 %), while the lowest mortality rate was recorded for the cross WDb (4.7 %). It seems that W and Db lines are interacted together to increase or reduce mortality rate in the progeny. So, this result recommend or suggest to cross W sires with Db dams. Generally, the line Db and its crosses resulted in high mortality rates, which may reflect the presence of lethal genes, because most of mortal birds dead during the earlier growth period. While the Lb line and its crosses recorded intermediate percentages ranged from (7.9 – 8.6 %). However, Consitantini and Panella, (1982); Shoukat *et al*., (1988) and Vieira and Moran, (1998) found less mortality percentages in quail birds during laying periods.

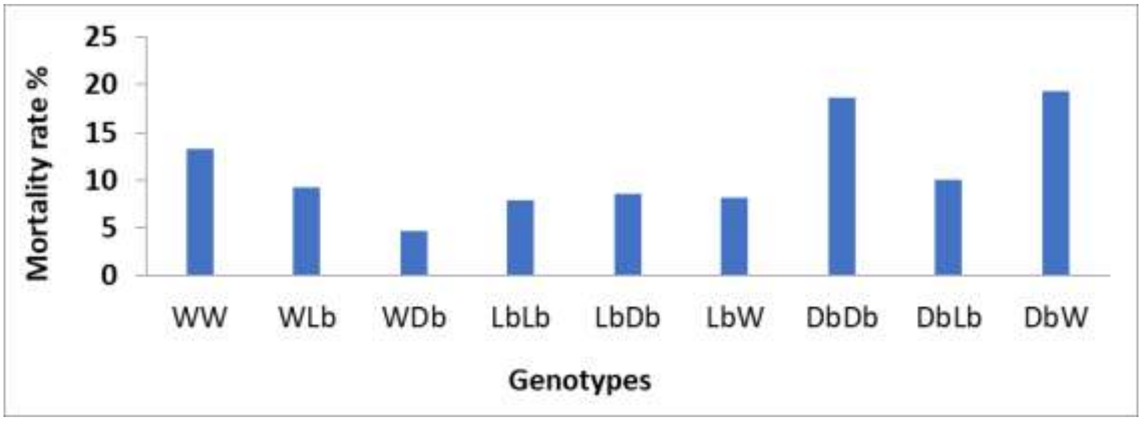

Figure 6. Mortality rate (%) during the whole trial period in quail genotypes.

Fertility and hatchability (%):

Effect of genotype on fertility and hatchability (%) illustrated in Figure (7). The results showed that the fertility% ranged, from (80.82-91.71%) for pure genotypes; and ranged from (76.17-90.3%) for crosses and finally ranged from (83.18-89.62%) for the reciprocal crosses. In respect to hatchability percentage, the pure genotypes recorded the highest range of (90.4-92.63%); while the crosses had the lowest range of (86.21-87.71%) and the reciprocal crosses were recorded the intermediate range of (89.35-91.19%). The overall fertility% was 85.53 and the overall hatchability% was 89.51% for all genotypes. However, the highest fertility % was recorded in the pure genotype (Db*Db) as value of (91.71 %), while the highest hatchability percentage was recorded in the pure genotype (LbLb) as value of (92.63%). Murakami and Ariki, (1998) mentioned 88% fertility and 75% hatchability when the ratio of females per male was two to three. Shanaway, (1994) and Khurshid *et al.*, (2004) who reported improvement the hatchability with increase in egg weight of Japanese quails.

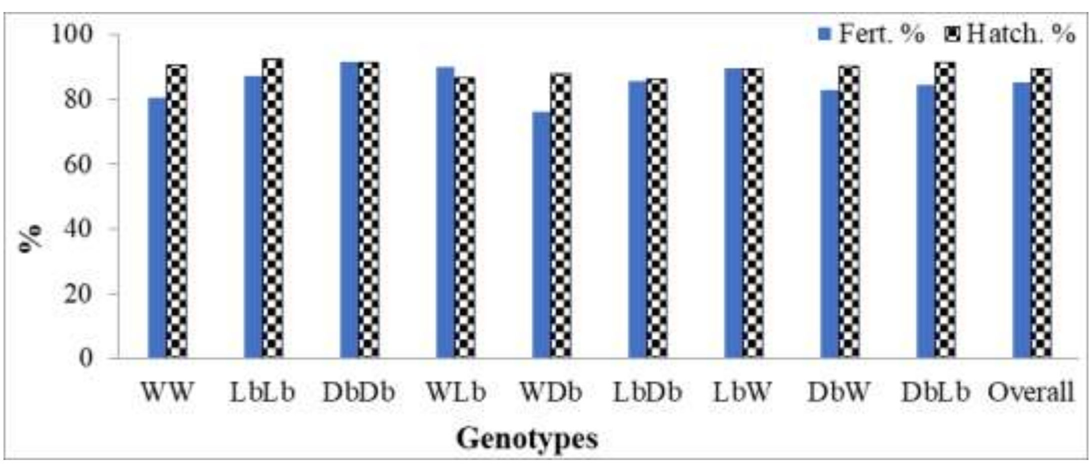

Figure 7. Effect of quail genotype on fertility and hatchability (%).

Conclusions:

It could be concluded from the present research, that for growth performance the Lb line could be used as sire or dam in crossing with both Db dam or W sire, respectively, because it resulted in a satisfy gain and FCR, respectively; while, the best combination for laying performance was W line as sire with Db line as dam.

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الأداء الإنتاجي لتسعة تراكيب وراثية من السمان الناتجة عن التهجين ثنائي الأليل

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الملخص

استخدم عدد 1296 صوصاً بعمر يوم واحد من تسعة تراكيب وراثية من السمان في هذه التجربة. وقد تم فقس ورعاية الصيصان في مزرعة الدواجن التابعة لقسم الإنتاج الحيواني بكلية الزراعة في جامعة دهوك بإقليم كوردستان–العراق. وقد تم الحصول على التراكيب الوراثية المدروسة من ثلاثة خطوط هي (الأبيض W، والبني الفاتح Lb، والبني الغامق Db)، باستخدام تصميم التهجين ثنائي الأليل. وكان الهدف من هذا البحث هو دراسة الأداء الإنتاجي لتسعة تراكيب وراثية (طرز) ناتجة من التهجين المذكور الكامل. وقد تم دراسة الصفات والخصائص الآتية: وزن الجسم الحي (BW)، والزيادة الوزنية (WG)، والإستهلاك العلفي (FI)، ومعامل تحويله (FCR)، ووزن البيض (EW)، وعدده (EN) وكتلته (EM)، ومعدل النفوق (MR%)، ونسبتي الخصوبة (F%) والفقس (H%). أظهرت نتائج وزن الجسم الحي فروقاً عالية المعنوية ($p<0.01$) بين التراكيب المدروسة وكذلك بين الجنسين. بينما لم يسجل كل من الزيادة الوزنية والإستهلاك العلفي ومعامل تحويل العلف (لفترتي النمو وإنتاج البيض) فروقاً ذات دلالة إحصائية ($p>0.05$) بين تلك التراكيب. أما إنتاج البيض، فقد سجلت صفة وزن البيض فروقاً عالية المعنوية ($p<0.01$) بين التراكيب (الطرز) المدروسة وفقط في الأسبوع الأول من الإنتاج، والتي يمكن أن تكون عائدة إلى إختلافات الوزن الحي بين طيور السمان قبيل دخولها عمرالنضج الجنسي. وقد سجل الهجين (W*Db) وبفروق معنوية ($p<0.01$) أقل معدل نفوق (4.7 %) بينما هجينه العكسي (Db*W) كان قد سجل أعلى معدل نفوق (19.3 %). وكانت أعلى نسبة خصوبة (91.7 %) محققة من قبل التركيب (DbDb)، بينما أعلى نسبة فقس (92.6 %) كانت من نصيب التركيب (LbLb). تنصح الدراسة باستخدام خط السمان الأبيض (W) كآباء واستخدام الخط البني الغامق (Db) كأمهات، مع إمكانية إحلال الخط البني الفاتح (Lb) كأمهات أمام الأبيض أو كآباء أمام البني الغامق في التهجينات المستقبلية للحصول على أفضل إنتاج من تلك الطيور.

الكلمات المفتاحية: السمان، التهجين ثنائي الأليل، الأداء الإنتاجي، الخصوبة والفقس.