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A COMPARATIVE STUDY ON SOME REPRODUCTIVE TRAITS IN BOUSCAT AND CALIFORNIAN RABBITS.

by

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ABSTRACT: This study was carried out at the Experimental Rabbit Farm, Department of Animal Production, Faculty of Agriculture, Al-Azhar University, Nasr City Cairo, Egypt, during two consecutive years of production starting in September 2005 till August 2007. Bauscat (B) and Californian (CAL) were used. Were used. Records of 227 litters in Californian and 206 litters in Bauscat rabbits were used to investigate some non-genetic effects i.e.season of kindling , age of doe and year of mating on some doe litter traits and to estimate heritability and repeatability of cofficients these traits.

The obtained results could be summarized as follows:

CAL rabbits showed large superiority over B rabbits for all doe litter traits studied.

Estimates of CV% for NBA (Number born alive) and LSW (Litter size at weaning) were 40.4 and 46.8% in B rabbits and 33.0 and 35.8% in CAL rabbits, while, those for LWB, LWW and PLWG, were 42.9, 43.3 and 43.8% in B rabbits and 28.2, 32.2 and 41.6% in CAL rabbits. Generally, estimates of CV % for doe litter traits studied increased from birth to weaning in CAL rabbits .

Season of kindling showed a significant ($P<0.05$ or $P<0.001$) effect on most doe litter traits studied in both breeds except LSW in B rabbits and LWW in CAL rabbits which the effect of season of kindling was non-significant.

Age of doe at kindling showed significant ($P<0.05$, $P<0.01$or $P<0.001$) effect on NBA, LWB(Litter weight at birth) and PLWG in B rabbits and LSW, LWW(Litter weight at weaning) and PLWG(Pre-Weaning litter weight gain) in CAL rabbits.

PLWG(Pre-Weaning litter weight gain) in CAL rabbits.

Year of kindling had non-significant effect on all doe litter traits studied in B rabbits, while it had significant effect ($P< 0.05$ or $P< 0.01$) on NBA and LSW in CAL rabbits.

Heritability estimates for doe litter traits studied were 0.13, 0.20, 0.17, 0.20 and 0.19 in B rabbits and they were 0.18, 0.20, 0.22, 0.32 and 0.20 in CAL rabbits for NBA, LSW, LWBA, LWW and PLWG, respectively. Generally, heritability estimates in CAL rabbits were to some extent higher than in B rabbits for all doe litter traits studied.

Repeatability estimates for all doe litter traits studied in B and CAL rabbits ranged between low to moderate .

INTRODUCTION

Rabbits in Egypt, currently fall for short of reaching the limits of their potential for meat production (Khalil *et al.*, 1986). Rabbits have a number of characteristics that would make them particularly suitable as meat-producing animals especially when compared with other herbivorous animals. Rabbits could contribute significantly in solving the problem of meat shortage (Taylor, 1980 and Lebas, 1983). Meat of rabbits has a low cholesterol level, high protein/ energy ratio and is relatively rich in essential fatty acids, very high in good quality protein content, low in fat and coloric cantered, contains higher percent of minerals than other meats and good meat to bone ratio compared to other livestock meats (Hunt, 1980).

The genetic parameters are very important in the progress of genetic improvement of different breeds and in designing its breeding programs that allow the genetic evaluation of such a breed and study its genetic properties.

Several studies were carried out to investigate the productive potentialities of native and exotic breeds of rabbits under the Egyptian conditions, but till now there is a need to obtain more information about the genetic, environmental and managerial aspects of rabbit production to create a profitable industry.

The main objectives of the present study are to evaluate and quantify the genetic and non-genetic aspects of doe litter traits (Number born alive,

litter size at weaning, litter weight at birth, litter weight at weaning, and pre-weaning litter weight gain) in Bauscat and California rabbits.

MATERIALS AND METHODS

Data used in the present study was collected from the Experimental Rabbit flock maintained by the Department of Animal Production, Faculty of Agriculture, Al-Azhar University, Nasr City, Cairo, Egypt, through two consecutive years of production started from September 2005 till August 2007.

Were used in the study Two exotic breeds of rabbit, Bauscat (B) and California (CAL) werw used. These two breeds are commonly and widely exotic breeds of rabbits used in Egypt. Number of sire, dam and litters used from B and CAL rabbits according to year of production are presented in Table (1).

Matings started in September 2005. According to the breeding plan, bucks were assigned at random to breed the does with a restriction to avoid full-sib, half-sib and parent offspring matings. Each buck was allowed to sire all litters given by 3-4 does throughout the two years of the study. Culled or dead does and bucks during experimental period were replaced randomly by their substitutes from the same breed from the original flock. Rabbits were raised in a semi-closed rabbitry. Breeding does and bucks were housed separately in individual wire-cages with standard dimensions arranged in double-tier batteries .

According to the breeding plan, each doe was transferred to the cage of the assigned buck to be mated and returned back to her own cage after being mated. Each doe was palpated 10 days thereafter to determine pregnancy. Does that failed to conceive were returned to the same mating buck to be re-mated until a service was observed. Weaning occurred at 28 days after birth, and young rabbits were sexed and tattooed and transferred to another battery to be housed in groups of 3 to 4 individuals in standard progeny wire cages equipped by feeding hoppers and drinking nipples.

The rabbits were fed *ad-libitum* on commercial pelleted ration, which could provide 16.3% crude protein, 13.2% crude fibers and 2.5% fat. Rabbits were kept under the same managerial, hygienic and environmental conditions.

Table (1) . Number of sire, dam and litters used from B and CAL rabbits according to year of production.

Year of production	B x B			CAL x CAL		
	2005-2006	2006-2007	Total	2005-2006	2006-2007	Total
No. of does	25	27	52	26	23	49
No. of sires	14	14	28	16	12	28
No. of bucks	6	6	12	14	13	27
No. of litters	100	106	206	115	112	227

Data and statistical analysis:

Data collection was organized in one contained records of pure-breed B and CAL rabbits in set of traits can be distinguished viz. doe litter traits number born alive (NBA), litter size at weaning (LSW) at 4weeks of age, litter weight at birth (LWB), litter weight at weaning (LWW) and pre-weaning litter weight gain (PLWG).

Data of doe litter traits were analyzed for each breed separately using Henderson's Method III (Henderson, 1984) by using the following mixed model (Harvey 1990).

$$Y_{kmoLp} = \mu + S_k + Sk_m + AK_o + Y_l + ekolmp \quad \text{(Model, 1)}$$

Where:

Y_{kmoLp} = the observation on the k moilpth doe trait;
μ = overall mean, common element to observations
S_k = random effect of kth sire,
Sk_m = fixed effect of the mth season of kindling m, $_{1,\ldots,4}$
AK_o = fixed effect of the oth age of doe at kindling o, $_{7,\ldots,16}$
Y_l = fixed effect of the lth year of kindling, l_1, $_2$ and
e_{kmoip} = random deviation of the pth doe traits assumed to be independently randomly distributed, i.e. N.D (0, $\sigma^2 e$).

Data of doe litter traits were analyzed for each breed separately using Henderson's Method III (Henderson, 1984) by using the following mixed model (Harvey 1990).

$$Y_{kmoip} = \mu + D_i + Sk_m + AK_o + Y_l + e_{imolp} \quad \text{(Model, 2)}$$

Where:

Y_{imolp} = the observation on the imolp th doe trait;
μ = overall mean, common element to observations
Di = random effect of i^{th} doe;
Sk_m = fixed effect of the m^{th} season of kindling m, $_{1,\ldots,4}$
AK_o = fixed effect of the o^{th} age of doe at kindling o, $_{7,\ldots,16}$
Y_l = fixed effect of the l^{th} year of kindling, $l_{1,2}$ and
e_{imolp} = random deviation of the p^{th} doe traits assumed to be independently randomly distributed, i.e. N.D (0, $\sigma^2 e$).

Estimation of heritability and repeatability :

Heritability estimates of doe traits and growth traits were computed for each breed separately using paternal full-sib relationship, as four times the intra-class correlation coefficient between sire groups (Harvey, 1990). $h^2_s = 4\,\sigma^2 s / (\sigma^2 s + \sigma^2 e)$.

Also, Repeatability estimate of doe traits was calculated as the doe intra-class correlation (t_d) according to (Harvey, 1990) as: $t_d = \sigma^2 d / (\sigma^2 d + \sigma^2 e)$.

RESULTS AND DISCUSSION

Doe litter traits:

Actual means and standard deviation for doe litter traits in B and CAL rabbits are presented in Table (2). Estimates of means revealed that means of NBA and LSW were 5.8 and 4.7 bunnies in B rabbits and 6.3 and 5.1 bunnies in CAL rabbits, while, those for LWB, LWW and PLWG, were 285.1, 1899.0 and 1580.1 gm, respectively in B rabbits and being 316.7, 1941.3 and 1626.6 gm in CAL rabbits. These means are within the ranges reported for the two exotic breeds in the Egyptian literature (Ibrahim *et al.*, 2000; Enab, 2001; Farid, 2004; Farid *et al.*, 2004 and Gharib, 2004 & 2008).

Estimates of CV% for NBA and LSW, were 40.4 and 46.8% in B rabbits and 33.0 and 35.8% in CAL rabbits, while, those for LWB, LWW and PLWG, were 42.9, 43.3 and 43.8% in B rabbits and 28.2, 32.2 and 41.6% in CAL rabbits.

Khalil (1993a) reported that the high variation in litter traits may be due to managerial decisions, in terms of post-partum mating schedule....

etc. However Afifi *et al.*, (2000) reported that variation in management procedures in rabbits may be due to (e.g. variation in time of mating after kindling, palpation time, fertility of doe and buck, feeding, etc.), contributed to the magnitude of the CV % estimates of doe reproductive traits.

Table (2) . Actual means, standard deviations (SD) and coefficients of variation (CV%) for doe litter traits in Bauscat and Californian rabbits

Traits	Bauscat				Californian			
	No.	Mean	SD	CV %	No.	Mean	SD	CV %
Number born alive (bunny)	206	5.82	2.35	40.37	227	6.33	2.09	33.01
Litter size weaning (bunny)	192	4.68	2.19	46.79	216	5.06	1.81	35.77
Litter weight at birth (gm)	206	285.08	122.36	42.92	227	316.74	90.51	28.57
Litter weight at weaning (gm)	192	1898.98	821.31	43.25	216	1941.34	624.33	32.15
Pre-weaning litter weight gain (gm)	192	1580.10	692.29	43.81	216	1626.59	677.08	41.63

Non genetic effects:

Season of kindling:

Results presented in Table, (3) clear that season of kindling showed a significant ($P<0.05$ or $P<0.001$) effect on most of the doe litter traits in both breeds studied except LSW in B rabbits and LWW and PLWG in CAL rabbits which showed non-significant effect. Litters born during winter and autumn recorded the largest NBA and LSW and heaviest LWB, LWW and PLWG in both breeds of rabbits (Tables, 4&5). These findings are similar to those reported by Youssef (1992), Nasr (1994), Enab *et al.*, (2002), Gharib (2004) and Gharib (2008).

Furthermore, Youssef (1992) showed that variation of litter traits due to season of kindling is a reflection of the in variability pattern of feed quality. Similar conclussion was repeated by (Abd El-Aziz, 1998).

Age of doe at kindling:

Results presented in Table, (3) clear that age of doe at kindling showed significant ($P<0.05$, $P<0.01$or $P<0.001$) effects on NBA and

LWB in B rabbits and LSW, LWW and PLWG in CAL rabbits. In this respect these results agree with most reviewed studies reported by (Afifi and Emara, 1984a; Afifi and Emara 1987 ; Afifi and Khalil, 1990 and Ahmed, 1997). However, Rollins *et al.*, (1963) reported a significant effect for age of dam on number born alive, number weaned and total litter weight. Lukefahr *et al.*, (1983) through estimating linear and quadratic regressions reported that age of dam at kindling significantly influenced litter weight at birth., while it showed non-significant effect on LSW, LWW and PLWG in B rabbits and NBA and LWB in CAL rabbits.

Results enlisted in Tables (4&5), showed an inconsistent trend for all doe litter traits as affected by age of doe at kindling. Ahmed (1997) with NZW and CAL rabbits obtained similar results for doe litter traits.

Table (3). F-ratios of least squares analysis of variance for different factors affecting doe litter traits in Bauscat and Californian rabbits.

Source of variation	F-ratios					
	d.f	NBA	LSW	LWB	LWW	PLWG
Bauscat						
Sire of doe	27	1.24 ^{ns}	1.37 ^{ns}	1.30 ^{ns}	1.32 ^{ns}	1.30 ^{ns}
Season (SK)	3	8.60 ***	1.96 ^{ns}	16.02 ***	6.09 ***	4.05 **
Age of doe at kindling (DA)	10	2.16 *	0.68 ^{ns}	1.97 *	1.28 ^{ns}	0.90 ^{ns}
Year of kindling (YK)	1	1.39 ^{ns}	0.08 ^{ns}	0.15 ^{ns}	0.01 ^{ns}	0.01 ^{ns}
Remainder (d.f)		164	150	164	150	150
Remainder (M.S)		4.0	4.4	10891.8	589508.5	431162.4
Californian						
Sire of doe	27	1.34 ^{ns}	1.37 ^{ns}	1.43 ^{ns}	1.60 *	1.43 ^{ns}
Season (SK)	3	13.14 ***	5.93 ***	4.99 **	1.38 ^{ns}	0.93 ^{ns}
Age of doe at kindling (DA)	10	1.57 ^{ns}	1.17 *	1.05 ^{ns}	3.76 ***	2.99 **
Year of kindling (YK)	1	8.74 **	6.04 *	3.63 ^{ns}	1.27 ^{ns}	0.96 ^{ns}
Remainder(d.f)		185	174	185	174	174
Remainder (M.S)		3.09	2.6	7128.1	314878.7	399842.6

Year of kindling:

Results obtained in Table (3) indicated that year of kindling had non-significant effect on all doe litter traits studied in B rabbits, while it had significant effect (P< 0.05 or P< 0.01) on NBA and LSW in CAL rabbits. The same trend was observed by Hilmy (1991); Youssef (1992); Gad (1998) and Abou-khadiga. (2004) who reported significant (P<0.05 or P<0.01or) effect for year of kindling on NBA and LSW in different

breeds of rabbits. On the other hand, El-Raffa *et al.*, (1997); Gad. (1998); Hassan *et al.*, (1999); and Farid *et al.*, (2004) showed non-significant effect for year of kindling on most doe litter traits.

Estimates obtained in Tables (4&5) indicate that, litters born of the second year were larger in their size and heavier in their weight and gain than litters of the first year of the present study except LWB and LWW in B, where the first year was better than the second year. The differences from year to another might be due to changes and fluctuations in environmental, climatic, labor skill, feeding and health conditions, as well as changes of the genetic make up of the flock within long periods which were associated with year of production (Khalil *et al.*, 1988 and Afifi *el al.*, I989).

Genetic effects:

Sire variance components (V %):

Percentages of variance (V %) of doe litter traits due to sire of doe and remainder in Bauscat and Californian rabbits are presented in Table (6). These estimates were 3.4, 5.6, 4.3, 5.0 and 4.6 % in B rabbits and 4.3, 5.1, 5.6, 8.1 and 4.9 % in CAL rabbits for doe litter traits NBA, LSW, LWB, LWW and PLWG respectively. These percentages mostly in B were higher than those reported by Ahmed (1997); Afifi *et al.*, (1998); Abd El-Halim (2003) and Gharib (2004), while they were lower than those reported by Khalil *et al.*, (1987) and Khalil and Afifi (1991).For CAL, percentages of variance were mostly higher than these reported by Khalil and Soliman, 1989; Afifi *et al.*, (1992); Ahmed, 1997 and Afifi *et al.*, (1998).

Differences between the present estimates of sire V% from those reported in the literature, may be due to differences in samples, methods of estimation, geographic locations and environmental conditions to which the rabbits were exposed.

Table (4). Least-squares means and standard errors (S.E) for factors affecting doe litter traits in Bauscat rabbits.

Independent variable	No.	NBA Means± S.E	No.	LSW Means ± S.E	No.	LWB Means ± S.E	No.	LWW Means ± S.E	PLWG Means ± S.E
Overall mean	206	5.73±0.23	192	4.60±0.27	206	291.41±12.70	192	1869.30±98.35	1523.17± 82.96
Season of kindling									
Autumn	53	7.77±0.55	50	5.64±0.61	53	413.16±29.31	50	2317.94±224.37	1690.43± 191.39
Winter	58	6.63±0.41	53	4.94±0.46	58	387.36±21.97	53	2392.56±168.91	1913.39± 143.49
Spring	47	4.91±0.46	44	4.37±0.54	47	216.86±24.85	44	1471.57±197.17	1336.29± 168.05
Summer	48	3.62±0.45	45	3.46±0.51	48	148.26±24.23	45	1295.11±187.45	1152.58± 159.71
Age of doe at kindling (DA)									
6	25	4.76±0.63	23	4.33±0.96	25	185.18±33.58	23	1601.90±253.68	1565.71± 216.51
7	27	5.68±0.56	26	4.34±0.63	27	219.47±29.92	26	1721.79±231.75	1627.50± 197.71
8	23	5.58±0.51	22	5.21±0.56	23	235.11±27.37	22	1527.86±206.36	1441.13± 175.93
9	31	4.87±0.41	30	4.44±0.46	31	270.33±22.08	30	1753.01±168.01	1451.33± 143.01
10	19	5.41±0.52	17	4.24±0.59	19	260.75±27.81	17	1555.80±217.00	1270.09± 185.07
11	15	5.83±0.59	13	4.75±0.67	15	272.87±31.19	13	2096.35±245.14	1553.32± 209.19
12	19	6.11±0.54	17	4.67±0.26	19	315.71±28.89	17	2148.38±225.29	1612.67± 192.17
13	21	7.86±0.57	20	5.72±0.64	21	393.71±30.56	20	2526.61±235.32	1924.85± 200.77
14	17	6.51±0.66	16	4.36±0.67	17	351.63±35.04	16	2146.25±279.76	1682.56± 238.86
15	7	6.15±0.90	6	4.14±1.03	7	388.00±47.78	6	1926.42±376.43	1497.94± 321.63
16	2	4.43±1.62	2	4.32±1.53	2	312.74±80.49	2	1557.91±593.86	1127.78± 507.70
Year of kindling									
2005-2006	117	5.50±0.28	109	4.54±0.32	117	295.27±15.16	109	1876.74±116.17	1515.58± 98.38
2006-2007	89	5.96±0.31	83	4.66±0.36	89	287.55±17.02	83	1861.86±130.97	1530.76± 111.14

Table (5). Least-squares means and standard errors (S.E) for factors affecting doe litter traits in Californian rabbits.

Independent variable	NBA		LSW		LWB		LWW	PLWG
	No.	Means± S.E	No.	Means ± S.E	No.	Means ± S.E	No.	Means ± S.E	Means ± S.E
Overall mean	227	6.09± 0.16	216	4.91±0.15	227	313.57±8.09	216	1894.44±60.54	1623.59±60.95
Season of kindling									
Autumn	52	7.0 4± 0.32	49	5.61±0.30	52	353.36±15.88	49	1834.72±110.25	1609.00±120.41
Winter	72	7.07± 0.32	71	5.39±0.30	72	320.52±15.62	71	2079.89±108.29	1771.40±118.13
Spring	59	5.11± 0.27	54	4.29±0.27	59	282.18±13.61	54	1793.76±97.65	1517.17±105.69
Summer	44	5.13± 0.36	42	4.36±0.34	44	298.21±17.67	42	1869.37±122.25	1596.78±134.31
Age of doe at kindling (DA)									
6	20	5.37± 0.51	19	3.90±0.48	20	284.15±24.69	19	1458.96±170.33	1094.48±189.48
7	23	6.37± 0.42	23	4.91±0.39	23	323.93±20.35	23	1877.42±138.37	1545.78±152.89
8	28	6.91± 0.37	27	5.13±0.35	28	319.69±18.17	27	1765.41±125.85	1451.08±138.47
9	36	6.42± 0.32	33	4.82±0.31	36	303.19±15.94	33	1912.62±113.43	1569.69±124.10
10	22	6.24±0.43	21	5.46±0.41	22	336.47±21.17	21	2092.40±147.41	1859.10±163.27
11	21	6.59±0.52	21	5.66±0.48	21	326.22±25.09	21	2121.56±172.04	1752.12±191.43
12	20	5.97±0.48	20	5.12±0.45	20	362.02±23.64	20	1687.56±160.27	1305.68±178.00
13	19	6.18±0.44	17	5.16±0.42	19	290.23±21.54	17	2326.58±151.23	2014.03±167.64
14	18	5.66±0.48	17	4.94±0.46	18	312.91±23.43	17	2373.63±162.52	2053.18±180.56
15	13	6.48±0.53	12	4.86±0.51	13	321.58±25.57	12	1919.12±179.31	1574.70±199.73
16	7	4.80±0.73	6	4.08±0.72	7	268.85±35.52	6	1303.54±252.32	1639.32±282.68
Year of kindling									
2005-2006	112	4.42± 0.58	106	3.51±0.59	112	262.00±28.42	106	1670.72±208.69	1303.74±233.17
2006-2007	115	7.75± 0.58	110	6.31±0.58	115	365.14±28.00	110	2118.16±205.41	1943.44±229.44

Table (6). Estimates of sire variance component , percentages (V%) and Heritability (h^2) for doe litter traits in B and CAL rabbits.

Traits	σ^2_s	V%	σ^2_e	V%	$h^2_s \pm SE$
Bauscat					
Number born alive	0.14	3.4	3.96	96.6	0.13±0.20
Litter size at weaning	0.26	5.6	4.42	94.4	0.20±0.20
Litter weight at birth	489.15	4.3	10891.78	95.7	0.17±0.20
Litter weight at weaning	1004.19	5.0	589508.48	95.0	0.20±0.22
Pre-weaning litter weight gain	20911.30	4.6	431162.41	95.3	0.19±0.22
Californian					
Number born alive	0.14	4.3	3.08	95.7	0.18±0.19
Litter size at weaning	0.14	5.1	2.60	94.9	0.20±0.20
Litter weight at birth	426.23	5.6	7128.08	94.4	0.22±0.20
Litter weight at weaning	27719.66	8.1	314878.64	91.9	0.32±0.22
Pre-weaning litter weight gain	20485.91	4.9	399842.65	95.1	0.20±0.20

Heritability:

Estimates of paternal half-sib heritability for doe traits using Henderson III method in Bauscat and Californian rabbits are given in Tables (V). Heritability estimates in CAL rabbits were to some extent higher than in B rabbits for all traits studied. These estimates were within those reported by (Garcia *et al.*, 1980; Afifi *et al.*, 1992 and Ahmed, 1997), while. they were lower than those reported for LSW and LWB by Kadry and Afifi (1984) and Ferraz *et al.*, (1991).

El-Zanfaly (1996) reported that most of the discrepancies between estimates of sire heritability, from different studies, may be attributed to the differences in breeds groups of rabbits reared under particular environmental conditions during definite periods of time, size of data and variations in the statistical methods adopted.

Doe variance components (V %):

Percentages of doe variance components (V %) were 3.38, 4.53, 3.80, 0.44 and 0.44 in B rabbits, while They were 0.0, 5.30, 6.71, 10.57 and 8.40 in CAL rabbits for NBA, LSW, LWB, LWW and PLWG, recpectivly. Khalil *et al.*, (1988) demonstrated the importance and the

relatively higher magnitude of the doe variance component for doe litter traits at birth and at weaning. Khalil (1994) added that these maternal effects could be ascribed to the number of mature, fertilized and firmly incorporated ova, the genes she transmits to her offspring, the environment which the doe provides for her litter together with the differences in milk production during suckling period.

Table (7). Estimates of doe variance component and percentages (V%), repeatability (t) for doe litter traits in B and CAL rabbits.

Traits	σ^2_d	V%	σ^2_e	V%	t ± SE
Bauscat					
Number born alive	0.14	3.38	3.99	96.62	0.13±0.26
Litter size at weaning	0.21	4.53	4.48	95.47	0.18±0.29
Litter weight at birth	432.11	3.80	10928.96	96.20	0.15±0.27
Litter weight at weaning	2.55	0.44	572.77	99.46	0.02±0.28
Pre-weaning litter weight gain	1998.11	0.44	449050.14	99.46	0.02±0.28
Californian					
Number born alive	0.00	0.00	3.25	100.00	0.00
Litter size at weaning	0.15	5.30	2.68	94.70	0.21±0.25
Litter weight at birth alive	505.49	6.71	7021.62	93.29	0.27±0.24
Litter weight at weaning	36030.26	10.57	304879.91	89.43	0.24±0.27
Pre-weaning litter weight gain	35221.25	8.40	383997.21	91.60	0.34±0.27

Khalil (1993b) suggested that the existence of negative covariance between adjacent litters could probably be responsible for this, which was stated previously on the same breed by Khalil and Mansour (1987). The absence of positive doe variance component for some litter traits and the small value observed for others (e.g. Afifi, 1991; Khalil, 1993a&b and Ahmed, 1997) suggest unreliable estimates of variance component for these traits.

Repeatability:

Repeatability estimated using Henderson III method for doe litter

traits in B and CAL rabbits are given in table7. These estimates were 0.13, 0.18, 0.15, 0.02 and 0.02 in B rabbits, while were 0.00, 0.12, 0.27, 0.24 and 0.34 I CAL rabbits for NBA, LSW, LSB, LWW and PLWG. These estimates indicated that doe litter traits at different ages showed low or moderate repeatability. as reported by by Afifi *et al.*, 1992; Abd El-Raouf, 193; Khalil, 1993a&b; Farghaly, 1996 and Ahmed, 1997).

Lukefahr *et al.*, (1983) reported small or negative estimates of repeatability. Among CAL and B rabbit Repeatability estimates in CAL rabbits were to some extent higher than in B rabbits for all traits studied.

Any changes in repeatability estimates of economic litter traits with the change of herd environment condition were probably due to reduction in temporary differences among herd members, which is automatically associated by an improvement in the environmental conditions (Falconer, 1989).

Ahmed (1997) indicated that culling of does, for doe traits (litter size and weight at different ages) with moderate estimates, based on individual records, may be recommended, but it would be of little efficiency when considering low repeatable traits.

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دراسة مقارنه لبعض الصفات التناسلية فى أرانب البوسكات والكالفورنيا

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الملخص العربي

أجريت هذه الدراسة في مزرعة الأرانب البحثية بكلية الزراعة- جامعة الأزهر بمدينة نصر القاهرة – جمهورية مصر العربيه خلال سنتين إنتاجيتين متتاليتين بدأت في سبتمبر ٢٠٠٥م حتى أغسطس ٢٠٠٧م إستخدم في هذه الدراسة سلالتين من الأرانب البوسكات والكاليفورنيا وشملت التجربة بيانات ٢٢٧ بطن من أرانب الكاليفورنيا و ٢٠٦ بطن من أرانب البوسكات وذلك لدراسة بعض التأثيرات الغير وراثية (موسم الولادة - عمر الأنثى عند الولادة - سنة الميلاد) على بعض صفات خلفة البطن وكذلك تقدير المكافئات الوراثية والمعاملات التكرارية لهذه الصفات . وقد أوضحت الدراسة النتائج التالية :

١- أظهرت سلالة الكاليفورنيا تفوقا ملحوظا في جميع صفات أنثى الأرنب المدروسة عن سلالة البوسكات .

٢- كانت تقديرات معاملات الإختلاف لصفتى عدد المواليد الحية وحجم البطن عند الفطام ٤٠,٤و ٤٦,٨%فى سلالة البوسكات و ٣٣,٠و ٥٣,٨% فى سلالة الكاليفورنيا بينما تلك لصفات وزن البطن عند الميلاد والفطام ومقدارالزيادة فى وزن البطن من الميلاد وحتى الفطام كانت ٤٢,٩، ٤٣,٣ و٤٣,٨% فى سلالة البوسكات بينما كانت ٢٨,٢، ٣٢,٢ و ٤١,٦ % فى سلالة الكاليفورنيا وبصفة عامةإزدادت تقديرات معاملات الاختلاف لصفات خلفة البطن المدروسة من الميلاد إلى الفطام فى سلالة الكاليفورنيا .

٣- أظهرموسم الولادة تأثير معنوي على معظم صفات خلفة البطن في كلا النوعين ما عدا صفة حجم البطن عند الفطام في سلالة البوسكات ووزن البطن عند الميلاد في سلالة الكاليفورنيا.

٤- أظهرعمر الأنثى عند الولادة تأثير معنوي على صفات عدد المواليد الحية و وزن البطن عند الميلاد ومقدارالزيادة في وزن البطن من الميلاد وحتى الفطام في سلالة البوسكات وكذلك حجم البطن عند الفطام ووزن البطن عند الفطام ومقدارالزيادة فى وزن البطن من الميلاد وحتى الفطام في سلالة الكاليفورنيا .

٥- أظهرت سنة الميلاد تأثير غير معنوي على جميع صفات خلفة البطن المدروسة في سلالة البوسكات بينما أظهرت تأثير معنوي على صفتى عدد المواليد الحية وحجم البطن عند الفطام فقط في سلالة الكاليفورنيا.

٦- كانت تقديرات المكافئ الوراثي لصفات حجم البطن المدروسة (عدد المواليد الحية - حجم البطن عند الفطام – وزن البطن عند الميلاد - وزن البطن بعد الفطام - وزن البطن من الميلاد وحتى الفطام) ٠,١٣، ٠,٢٠، ٠,١٧، ٠,٢٠ و٠,١٩ في سلالة البوسكات و٠,١٨

٠,٢٠، ٠,٢٢، ٠,٣٢و ٠,٢٠ في سلالة الكاليفورنيا . وبصفة عامة كانت تقديرات المكافئ الوراثي لمعظم صفات أنثى الأرنب المدروسة في سلالة البوسكات أعلى منها فى سلالة الكاليفورنيا .

٧- تراوحت تقديرات المعامل التكراري لمعظم صفات أنثى الأرنب المدروسة في سلالتى البوسكات والكاليفورنيا مابين المنخفضة والمتوسطة .