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RELATIONSHIPS AMONG SOME GROWTH PERFORMANCE TRAITS AND LIFETIME PRODUCTIVITY OF BARKI EWES

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ABSTRACT

The present study was conducted to characterize lifetime performance of Barki ewes, estimating some genetic and phenotypic parameters for total lifetime performance traits and investigate the possibility of improving these traits. Lifetime performance records for 1040 Barki ewes daughters of 194 sires and 729 dams were obtained from 1963 to 2010 from the sheep flock of the Desert Research Centre and used in the present study. Data was analyzed using SAS and MTDFREML programs to carry out analysis of variance and estimate genetic and phenotypic parameters for the studied traits. The current study dealt with lifespan, productive, reproductive and partial lifetime productive traits. Lifespan traits included total lifetime, *TLT*, productive life, *PL* and lifetime score. Lifetime productive traits included total number and weight of lambs born and weaned. Lifetime reproductive traits included age at first lambing, *AgFL*, and lambing interval, *LI*. Three partial life time productive traits were calculated i.e., after the first lambing, cumulative first two lambing, and cumulative three lambing.

Results showed that throughout the lifetime, Barki ewe on the average gave birth to 2.77 lambs weighing 9.74 kg at birth and able to rear 2.53 weaned lambs weighing 49.01 kg at weaning. Barki ewes showed an average *TLT* of 2301.63 days (i.e., 6.3 years), during which she has 2.71 lambing season. *PL* represented 37.8% of *TLT* of the ewe while *AgFL,* accounted for 39% of *TLT*. Average *LI*, was 344.44 days. The present study emphasized on improving reproductive efficiency of Barki ewes in this flock rather than removing non- lambing ewes. Birth year had highly significant effect on all studied traits. Heritabilities were estimated for lifetime productive traits (ranged from 0.24 to 0.31), lifespan traits (ranged from 0.07 to 0.16) and lifetime reproductive traits (ranged from 0.03 to 0.12). Highly significant and positive genetic and phenotypic correlations were obtained between lifetime productive traits and lifespan traits. The partial trait of weight of lambs weaned for the first three lambing was found to be moderately heritable and highly significant positively associated genetically and phenotypically with the total weight of lamb weaned (*TWLW*) which recommend the utility of this trait as an indirect selection criterion to improve the *TWLW* throughout the lifetime. Selection based on total weight of lambs weaned after the first lambing is likely to achieve the target at an earlier stage.

Keywords: *Barki sheep, Genetic and phenotypic parameters, Ewe productivity, Lifetime performance traits*

INTRODUCTION

Lifetime production is the crucial measure of the ewe performance and contributes directly to the profitability of the flock. Profitable females may achieve their maximum productive capacity during their lifetime and sustain elevated level of production and reproduction attributes with acceptable body conformation for a long period of time without serious health problems. Furthermore, evaluating the cumulative lifetime production of a group of ewes presents a good measure of the entire flock operation (Iman and Slyter 1996). Investigating lifetime productivity requires complete and continuous recording from birth and will be only possible for ewes with recorded disposal date (El-Saied *et al.*, 2005). These information becomes available only late in life and therefore it would be of no use at the time of selection process during the lifetime of the animal. That is probably the reason behind scanty information available on lifetime productive efficiency in general and in Barki sheep in particular. On the other hand, direct genetic improvement for lifetime performance traits is hard to achieve, the alternative might go through indirect selection using the correlated response of other traits recorded early in life. Therefore, the objectives of the present study were to characterize lifetime performance of Barki ewes, estimating some genetic and phenotypic parameters for total lifetime performance traits and investigate the possibility of using some partial lifetime productive traits as an early selection criterion for improving these traits.

MATERIALS AND METHODS

Source of Data

Lifetime performance records with the full pedigree information for Barki ewes were obtained from the sheep flock of the Desert Research Centre maintained at two research stations at the north-western desert of Egypt; Ras Elhekma (RHRS, from 1963 to 1972) and Maryout (MRS, from 1973 to 2010). In 1972, the sheep flock at RHRS was moved to MRS. Management of the flock was almost the same in both stations where the breeding season usually lasted for two or three estrous cycles and carried out once a year in June – July to start lambing in October – November. At birth, lambs were ear tagged and weighed to assign birth weight. Lambs suckled their mothers freely and were weighed biweekly up to weaning, then weaned lambs joined the rest of the flock. Weaning weight was also recorded at approximately four months of age. Birth weight was kept as recorded while weaning weight was linearly adjusted to 120-day weaning weight of each lamb. After weaning, ewe lambs were separated from ram lambs till mating season. Young ewes were often first mated at approximately 18 months of age and remained within the flock unless they missed two successive lambing, so they culled. They also selected for heavier body weight, healthy status and body conformation. Feeding of the flock depends mainly on grazing at RHRS while rely on cut and carry at MRS. Sheep were allowed to drink fresh water twice daily. Detailed flock management was described by El-Wakil *et al.* (2009).

Editing of the original data was done to remove those animals that had missing identifications. A restriction was imposed to ensure that each sire has at least five daughters. After editing, the data set consisted of 1040 records of Barki ewes daughters of 194 sires and 729 dams. Some descriptive statistics of the studied traits are presented in table (1).

Studied Traits

In order to describe the entire ewe lifetime, the present study concerned with lifespan, productive, reproductive and partial lifetime traits. Lifespan traits included total lifetime, *TLT*, number of days between birth and disposal date. Productive life, *PL*, number of days between first lambing and the last productive destination of the animal life, in the present study would be the last birth or weaning date. Lifetime score, *LTS*, number of lambing for the ewe during her lifetime. For recording *LTS*, when the ewe gives birth to a survived or dead lamb (s), *LTS* increased by one, whereas in case of ewe that missed lambing, *LTS* got zero for that year. Lifetime productive traits included total number of lambs born per ewe, *TNLB*, total weight of lambs born per ewe, *TWLB*, total number of lambs weaned per ewe, *TNLW*, and total weight of lambs weaned per ewe, *TWLW*. Cumulative lamb production for each ewe was added together from each year to calculate the cumulative total lifetime number and weight of lamb born and weaned over the lifetime. Lifetime reproductive traits included age at first lambing, *AgFL*, and average interval between successive lambing during lifetime of each ewe, *LI*. For each of *TNLB*, *TWLB*, *TNLW* and *TWLW*, three partial lifetime traits were calculated for each ewe, i.e., after the first lambing, cumulative first and second lambing, and cumulative first, second, and third lambing. The disposal date for each ewe was recorded together with the reason for such culling.

Statistical Analyses

Descriptive statistics, phenotypic correlations as well as analysis of variance were conducted for the present data using the general linear model (GLM) procedure of SAS (2004). Preliminary analyses with two fixed effects (station and birth year) were carried out and identified birth year as being the important fixed effect (with 32 levels), so it is included in this analysis regarding the animal, sire and dam as random effects. The following model was used:

$$\mathbf{Y = X\beta + Z_a a + e}$$

Where:

Y = is a vector of observations of the studied traits,
X= is the incidence matrix for birth year fixed effect,
β = is the vector including the overall mean and the same fixed effect,
Z_a = is the incidence matrix for random effects,
a = is the vector of additive genetic effect of animal; and
e = is a vector of random residuals normally and independently distributed with zero mean and variance I σ^2_e.

Multiple trait animal model (MTDFREML) proposed by Boldman *et al.* (1995) was used to estimate the heritability and genetic correlations for the studied traits. Estimates of heritabilities were done using a series of univariate analyses for each studied trait, while estimates of genetic correlation coefficients were done using a series of bivariate analyses.

RESULTS AND DISCUSSION

Table (1) showed some descriptive statistics for total and partial lifetime performance traits. Throughout the lifetime, Barki ewe had from one to eleven lambs born with an average of 2.77 lambs weighing from 1.5 kg to 42.6 kg at birth with an average of 9.74 kg while at weaning she was able to rear from zero to 18 weaned lambs averaged 2.53 lambs weighing from zero to 230.9 kg with an average of 49.01kg. Barki ewes showed an average total lifetime, *TLT*, of 2301.63 days (i.e., 6.3 years), during which they have from one to ten lambing with an average lifetime score, *LTS*, of 2.71 lambing. Productive life, *PL*, was of average 869.92 days (i.e., 2.4 years) represented 37.8% of *TLT* of the ewe. The productive life recorded for Barki ewes considered that lamb production is the main function of the ewe particularly at birth and weaning in terms of the studied traits, number and weight of lambs born and weaned. Age at first lambing, *AgFL*, averaged 894.7 days (i.e., 2.5 years) and accounted for 39% of *TLT*. Average lambing interval, *LI*, was found to be 344.44 days which is approximately lambing once a year. It is worthwhile mentioned that the length of lifetime is also determined by culling decisions of the breeder. In the current data, the disposal date for each ewe together with the reason for such disposal were recorded and being calculated as 56% culling due to low production of the ewe, 34% due to death and 10% arbitrary slaughter as a result of unexpected accidents.

Table (1). Mean± standard error (SE), range and coefficient of variation (CV%) for the studied total and partial lifetime traits

Trait	Mean ± SE	Range	CV%
NLB1	1.01± 0.0	1.0 - 2.0	10.6
WLB1, kg	3.40± 0.0	1.5 - 8.5	19.9
NLW1	0.90 ± 0.0	0 - 2.0	37.1
WLW1, kg	16.87 ± 0.2	0 - 50.6	45.4
NLB12	1.74 ± 0.0	1 - 3.0	28.0
WLB12, kg	6.00 ± 0.1	1.5 - 13.0	32.4
NLW12	1.56 ± 0.0	0.0 - 3.0	41.1
WLW12, kg	29.73 ± 0.4	0.0 - 75.9	47.8
NLB123	2.23 ± 0.0	1.0 - 5.0	40.2
WLB123, kg	7.78 ± 0.1	1.50 - 17.3	43.9
NLW123	2.01± 0.0	0.0 - 5.0	49.8
WLW123, kg	38.87 ± 0.7	0.0 - 112.9	56.1
TNLB	2.77 ± 0.1	1.0 - 11.0	61.0
TWLB, kg	9.74 ± 0.2	1.5 - 42.6	64.7
TNLW	2.53 ± 0.1	0.0 - 18.0	70.5
TWLW, kg	49.01 ± 1.1	0.0 - 230.9	74.9
LTS	2.71 ± 0.1	1.0 - 10.0	58.9
TLT	2301.63 ± 23.4	752.0 - 4975.0	32.7
PL	869.92 ± 22.7	0.0 - 3702.0	84.2
AgFL	894.70 ± 7.3	378.0 - 1794.0	26.2
LI	344.44 ± 8.2	0.0 - 1155.0	76.5

Number of records for all traits= 1040, NLB1= number of lambs born per ewe after the 1st lambing, *WLB1*= weight of lambs born per ewe after the 1st lambing, *NLW1*= number of lambs weaned per ewe after the 1st lambing, *WLW1*= weight of lambs weaned per ewe after the 1st lambing, *NLB12*= number of lambs born per ewe after the first two lambing, *WLB12*= weight of lambs born per ewe after the first two lambing, *NLW12*= number of lambs weaned per ewe after the first two lambing, *WLW12*= weight of lambs weaned per ewe after the first two lambing, *NLB123*= number of lambs born per ewe after the first three lambing, *WLB123*= weight of lambs born per ewe after the first three lambing, *NLW123*= number of lambs weaned per ewe after the first three lambing, *WLW123*= weight of lambs weaned per ewe after the first three lambing, *TNLB*=total number of lambs born per ewe, *TWLB*= total weight of lambs born per ewe, *TNLW*= total number of lambs weaned per ewe, *TWLW*= total weight of lambs weaned per ewe, *LTS*= lifetime score, *TLT*=total lifetime, *PL*= productive life, *AgFL*=age at first lambing and *LI*=average lambing interval

In this flock from 1961-1970, Younis, *et al.* (1988) using data on 174 Barki ewes, out of them only 41 ewes had completed their lifetime performance. They found that the lifetime number of breeding seasons ranged from 1 to 6 with an average of 3.96. They also estimated total number of lambs born (3.07±0.18) and weaned (2.54±0.17) as well as total kilograms of lambs born (10.2±0.7 kg) and weaned (39.3±3.3 kg). On the other hand, total lifetime and productive life for Spanish Churra ewes were 2165 and 1216 days, respectively (El-Saied *et al.*, 2005) while total lifetime for Hill ewes in UK averaged 1756 days (Conington *et al.*, 2001). These estimates cannot be compared directly with the current study due to differences in the numbers of ewes and years involved as well as different environmental conditions, production system and breeding objectives applied for the other breeds.

As expected, high variability in terms of standard errors and coefficient of variation (CV%) were exhibited for all lifetime productive traits (total number of lambs born, *TNLB*, total weight of lambs born, *TWLB*, total number of lambs weaned, *TNLW*, total weight of lambs weaned, *TWLW*, CV% ranged from 61.0 to 74.9), lifespan traits (*LTS*, *TLT and PL*, CV% ranged from 32.7 to 84.2), reproductive traits (*AgFL* and *LI*, CV% ranged from 26.2 to 76.5) and partial lifetime traits recorded for number and weight of lambs born and weaned per ewe during the first three lambing (CV% ranged from 10.6 to 56.1). The variability in terms of CV% for partial lifetime traits tended to increase from birth to weaning and with advanced years (Table 1). The present lifetime performance traits included records from ewes had ten lambing opportunities while others had only one in addition to some records from ewes that did not lamb or wean a lamb, as well as from ewes that weaned more than one lamb per lambing opportunity. Moreover, productive life ranged from zero day when the ewe died after giving birth to 3702.0 days, hence relatively large standard errors and coefficients of variation were obtained. Regarding the *AgFL* and *LI*, it is thought that the age at first mating in this flock to be about 18 month of age to allow the ewe to bear the consequences of pregnancy, lambing and rearing her lambs. *AgFL* is seen as nonproductive period during the lifetime, it is lasted for about 2.5 years as a result of having some ewes missed their first lambing or gave birth to dead born lambs, and accordingly they got zeros in the present data. The wide variation appeared in lambing interval probably attributed to differences in reproductive efficiency between years and individual fertility differences among ewes. Improving reproductive management would diminish such unproductive stage of the animal life and offer an opportunity for increasing the efficiency of lamb production and lifetime productivity. Improving reproductive management to ensure higher fertility for

Barki ewes in this flock would be rather effective than removing non- lambing ewes.

Analysis of variance for total lifetime performance traits

Table (2) indicated that birth year contributed significantly (P<0.01) to variations in all studied lifetime traits. This could be explained by several factors involved in collecting the present set of data which extended for so many years such as fluctuations of environmental and managerial aspects during the lifetime of the ewe in addition to the quality and availability of feed…etc. Similar findings were reported in this flock (El-Wakil and Elsayed, 2013).

Table (2). Analysis of variance for total lifetime performance traits

Trait	Mean squares	
	Birth year (DF=31)	Residual (DF=1008)
TNLB	15.31**	2.48
TWLB	213.57**	34.35
TNLW	20.29**	2.64
TWLW	11740.11**	1028.90
LTS	13.64**	2.21
TLT	3177835.20**	487405.80
PL	11740.11**	1028.90
AgFL	463260.10**	42252.04
LI	187828.44**	65780.25

***DF*= degrees of freedom, *TNLB*=total number of lambs born, *TWLB*= total weight of lambs born, *TNLW*= total number of lambs weaned, *TWLW*= total weight of lambs weaned, *LTS*= lifetime score, *TLT*=total lifetime, *PL*= productive life, *AgFL*=age at first lambing and *LI*=average lambing interval, ** significant at P < 0.01.**

Heritability estimates for lifetime performance traits

Table (3) showed moderate heritability estimates for lifetime productive traits (*TNLB*, *TWLB*, *TNLW* and *TWLW*) ranged from 0.24 to 0.31 which were higher than the corresponding estimates for lifespan traits (*LTS, TLT and PL*) ranged from 0.07 to 0.16. As expected, low estimates of heritability ranged from 0.03 to 0.12 were obtained for the lifetime reproductive traits (*AgFL* and *LI). The current estimates were in accordance with the range reported in the literature (Snyman *et al.*, 1997; Conington *et al.*, 2001; Mohammadi *et al.*, 2012). Low estimates of heritability for lifespan traits imply that slow genetic progress is expected from direct selection for these traits. While direct selection for lifetime productive traits of moderate heritability appeared promising, however, it is not practical to select for these traits since it would be available only late in life after the disposal of these ewes. Consequently, genetic improvement for lifetime productive traits is dependent upon selection for partial lifetime productive traits which ascertain whether selection could or not be performed at an early stage. Improving *AgFL* and *LI* of low heritabilities could be achieved indirectly through the correlated response of other traits.

Table (3). Heritabilities (on diagonal), genetic (above diagonal) and phenotypic correlations (below diagonal) between the studied total lifetime performance traits

Trait	TNLB	TWLB	TNLW	TWLW	LTS	TLT	PL	AgFL	LI
TNLB	0.24 (0.04)	0.75 (0.05)	0.46 (0.01)	0.77 (0.02)	0.22 (0.05)	0.81 (0.05)	0.51 (0.06)	0.02 (0.01)	0.04 (0.02)
TWLB	0.98	0.25 (0.04)	0.74 (0.07)	0.76 (0.04)	0.17 (0.04)	0.15 (0.04)	0.26 (0.06)	-0.06 (0.02)	0.07 (0.02)
TNLW	0.94	0.93	0.30 (0.01)	0.40 (0.08)	0.26 (0.03)	0.98 (0.10)	0.60 (0.06)	-0.03 (0.01)	0.06 (0.03)
TWLW	0.92	0.93	0.95	0.31 (0.01)	0.53 (0.07)	0.32 (0.05)	0.34 (0.04)	-0.07 (0.02)	0.08 (0.02)
LTS	0.98	0.97	0.92	0.91	0.16 (0.03)	0.34 (0.07)	0.49 (0.05)	-0.13 (0.04)	0.05 (0.02)
TLT	0.83	0.83	0.80	0.80	0.84	0.13 (0.04)	0.37 (0.04)	0.04 (0.01)	0.17 (0.04)
PL	0.90	0.89	0.85	0.82	0.92	0.85	0.07 (0.02)	-0.09 (0.02)	0.16 (0.03)
AgFL	-0.09	-0.08	-0.11	-0.09	-0.10	0.17	-0.06	0.12 (0.04)	-0.15 (0.04)
LI	0.44	0.43	0.40	0.36	0.45	0.53	0.46	-0.01	0.03 (0.01)

Standard errors are in between brackets; *TNLB*=total number of lambs born, *TWLB*= total weight of lambs born, *TNLW*= total number of lambs weaned, *TWLW*= total weight of lambs weaned, *LTS*= lifetime score, *TLT*=total lifetime, *PL*= productive life, *AgFL*=age at first lambing and *LI*=average lambing interval. Significance of correlation coefficient at 0.05=0.19; Significance at 0.01=0.25

Genetic and phenotypic correlations among lifetime performance traits

Estimates of genetic and phenotypic correlations among the studied lifetime performance traits were presented in table (3). Phenotypic correlations appeared to be generally higher than the genetic ones. Highly significant and positive correlations were attained between lifetime productive traits (*TNLB, TWLB, TNLW* and *TWLW*) both genetically (ranged from 0.40 to 0.77) and phenotypically (ranged from 0.92 to 0.98). Highly significant and positive correlations of lifespan traits (*LTS, TLT and PL*) were obtained among themselves and with the lifetime productive traits genetically (ranged from 0.15 to 0.98) and phenotypically (ranged from 0.80 to 0.98). The high and significantly positive correlations among lifetime productive traits and lifespan traits may be attributed to the fact that many of the same factors/ or genes are involved in controlling these traits and imply that the increase in one trait would subsequently increase the others (Rashidi, 2012). On the other hand, it indicates that those individuals which maintained longer in the flock usually yield more and heavier progenies.

While *LI* was not significantly associated genetically with the studied traits, it had highly significant and positive phenotypic correlations with the studied traits ranged from 0.36 to 0.53, except for *AgFL*. Furthermore, *AgFL* was not significant phenotypically or genetically associated with the studied traits. Although not significant, the negative association of *AgFL* with the lifetime traits both genetically and phenotypically might indicate that as the lifespan and lifetime productive traits increased the relative impact of age at first lambing decreased. Reducing the age at first lambing would have a positive impact on genetic progress and the profitability of the farm through decreasing the generation interval and reducing the cost of maintaining lambs.

Heritabily estimates, genetic and phenotypic correlations between partial and lifetime productive traits

In order to predict lifetime productive traits from an early stage of life, partial lifetime traits were considered during the first three lambing and their results are presented in table (4). Heritability estimates for partial lifetime production traits tended to generally increase from the first to the third lambing. While that trend is consistent for phenotypic correlations, it has some fluctuations in the genetic ones. Heritability estimates for *TNLW* (0.30) and *TWLW* (0.31) were higher than the corresponding ones at birth; *TNLB* (0.24) and *TWLB* (0.25) as shown from table (3). El-Wakil *et al.* (2009) concluded that selection of Barki sheep based on weaning weight would be more effective compared with that of birth and yearling weights. On the other hand, regarding the limited natural resources prevailed in the north western desert of Egypt, an increase in number of lambs is not the solution to generate higher efficiency of the production system since it would contribute to overgrazing. However, selection for increased productive performance should be directed towards increasing the monetary value of the product in terms of weaning weight. Accordingly, inspecting *TWLW* in table (4), it is evident that heritability estimates for partial lifetime *WLW* for the first, the cumulative first and second and cumulative first three lambing seasons were 0.26, 0.30, and 0.32, respectively. These three partial lifetime productive traits were found to be positive and highly significantly associated genetically (0.38, 0.44 and 0.69) and phenotypically (0.37, 0.70 and 0.86) with the total lifetime *TWLW*. Thus, it might be rational to recommend the partial *WLW* for the first three lambing as an early selection criterion for *TWLW* throughout the lifetime. High lamb producing ewes during the first three lambing are most likely to be high lamb producing ewes during their lifetime. Similar conclusion was reached by Saoud and Hohenboken (1984) and Snyman *et al.* (1997). However, waiting after three lambing to select ewe would be impractical. Despite the high variability encountered in the current data set of this nature, the present study revealed moderate heritability for partial and lifetime productive traits together with high genetic and phenotypic correlations between them which might indicate that these traits are influenced by the same genes and could be looked at as part-whole relationship. That might suggest that selection on total weight of lambs weaned after the first lambing is likely to achieve the target at an earlier stage. Total weight of lamb weaned is determined by several factors and regarded as a composite trait combines ewes fertility, mothering ability, livability from birth to weaning, milk production of the ewe and growth potential of the lamb. Accordingly, the genes influencing these traits would have an effect on total weight of lamb weaned. Selection for the total weight of lamb weaned per ewe would maintain and upgrade these genes in the flock.

Table (4). Heritability estimates as well as phenotypic (above) and genetic correlations (bold below) between partial and total lifetime productive traits

Trait	h²	Correlations with			
		TNLB	TWLB	TNLW	TWLW
NLB1	0.09 (0.02)	0.08 0.10 (0.02)	0.06 0.15 (0.05)	0.05 0.42 (0.06)	0.04 0.47 (0.04)
WLB1	0.16 (0.03)	0.06 0.55 (0.04)	0.16 0.29 (0.03)	0.08 0.83 (0.06)	0.10 0.16 (0.04)
NLW1	0.17 (0.03)	0.12 0.91(0.05)	0.14 0.87 (0.03)	0.30 0.96 (0.04)	0.28 0.19 (0.03)
WLW1	0.26 (0.04)	0.15 0.54 (0.06)	0.19 0.61 (0.07)	0.29 0.96 (0.05)	0.37 0.38 (0.08)
NLB12	0.26 (0.03)	0.66 0.32 (0.02)	0.64 0.62 (0.04)	0.60 0.26 (0.03)	0.57 0.42 (0.02)
WLB12	0.32 (0.04)	0.62 0.66 (0.07)	0.66 0.53 (0.06)	0.58 0.90 (0.09)	0.58 0.59 (0.09)
NLW12	0.27 (0.04)	0.54 0.47 (0.04)	0.54 0.50 (0.03)	0.66 0.34 (0.06)	0.63 0.41 (0.07)
WLW12	0.30 (0.05)	0.52 0.28 (0.03)	0.55 0.24 (0.06)	0.62 0.63 (0.07)	0.70 0.44 (0.05)
NLB123	0.28 (0.05)	0.83 0.25 (0.08)	0.81 0.33 (0.04)	0.77 0.88 (0.07)	0.75 0.52 (0.06)
WLB123	0.30 (0.06)	0.81 0.61 (0.06)	0.84 0.55 (0.09)	0.76 0.40 (0.05)	0.76 0.48 (0.04)
NLW123	0.31 (0.05)	0.74 0.70 (0.04)	0.74 0.72 (0.06)	0.82 0.72 (0.04)	0.80 0.97 (0.07)
WLW123	0.32 (0.06)	0.73 0.33 (0.03)	0.75 0.39 (0.05)	0.79 0.63 (0.07)	0.86 0.69 (0.05)

Standard errors are in between brackets; *NLB1*= number of lambs born per ewe after the 1st lambing, *WLB1*= weight of lambs born per ewe after the 1st lambing, *NLW1*= number of lambs weaned per ewe after the 1st lambing, *WLW1*= weight of lambs weaned per ewe after the 1st lambing, *NLB12*= number of lambs born per ewe after the first two lambing, *WLB12*= weight of lambs born per ewe after the first two lambing, *NLW12*= number of lambs weaned per ewe after the first two lambing, *WLW12*= weight of lambs weaned per ewe after the first two lambing, *NLB123*= number of lambs born per ewe after the first three lambing, *WLB123*= weight of lambs born per ewe after the first three lambing, *NLW123*= number of lambs weaned per ewe after the first three lambing, *WLW123*= weight of lambs weaned per ewe after the first three lambing, *TNLB*=total number of lambs born per ewe, *TWLB*= total weight of lambs born per ewe, *TNLW*= total number of lambs weaned per ewe, *TWLW*= total weight of lambs weaned per ewe, Significance of correlation coefficient at 0.05=0.19; Significance at 0.01=0.25

CONCLUSION

Improving reproductive efficiency of Barki ewes in this flock is required as it would be rather effective to ensure higher fertility, increase the potentiality of lamb production and lifetime productivity than removing non-lambing ewes. The partial weight of lambs weaned for the first three lambing is recommended as an early selection criterion for total weight of lambs weaned throughout the lifetime. However, practically, the present study suggests that selection on total weight of lambs weaned after the first lambing is likely to achieve the target at an earlier stage.

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العلاقة بين بعض مظاهر النمو و الحياة الإنتاجية للنعاج البرقى

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أجريت هذه الدراسة لتوصيف حياة النعاج البرقى وتقدير المعالم الوراثية والمظهرية لصفات النعاج على مدار حياتها علاوة على دراسة امكانية تحسين هذه الصفات. أستخدمت فى هذه الدراسة سجلات عن صفات مظاهر الحياة لعدد ١٠٤٠ من النعاج البرقى البنات لعدد ١٩٤ كبش وعدد ٧٢٩ من الأمهات منذ عام ١٩٦٣ حتى عام ٢٠١٠ تم الحصول عليها من قطيع الأغنام التابع لمركز بحوث الصحراء. تم تحليل البيانات باستخدام البرامج الاحصائية ساس ونموذج الحيوان لاستنباط تحليل التباين وكذلك المعالم الوراثية والمظهرية للصفات المدروسة. اهتمت الدراسة بصفات طول حياة النعجة والصفات الإنتاجية والتناسلية على مدار حياتها. تضمنت صفات طول حياة النعجة طول الحياة الكلية و طول الحياة الإنتاجية وعدد الولادات على مدار حياة النعجة. كما تضمنت الصفات الإنتاجية على مدار حياة النعجة عدد و وزن الحملان المولودة والمفطومة لكل نعجة. كذلك تضمنت الصفات التناسلية على مدار حياة النعجة العمر عند أول ولادة والفترة بين الولادتين. كما تم تقدير الصفات الإنتاجية التى تمثل فترات محددة من حياة النعجة و هى بعد موسم الولادات الأول، وبعد موسم الولادات الأول والثانى وبعد المواسم الثلاثه الأولى.

أوضحت النتائج أنه على مدار حياة الحيوان، فإن النعجة البرقى تعطى فى المتوسط ٢,٧٧ حمل بمتوسط وزن ٩,٧٤ كجم عند الميلاد ولها القدرة على رعاية عدد ٢,٥٣ من الفطائم بمتوسط وزن ٤٩,٠١ كجم عند الفطام ويبلغ طول حياة النعجة الكلية ٢٣٠١,٦٣ يوما (حوالى ٦,٣ سنة) تعطى خلالها ٢,٧١ موسم ولادة وتمثل حياتها الانتاجية ٣٧,٨% من طول الحياة الكلية ويمثل العمر عند أول ولادة ٣٩% من الحياة الكلية للنعجة. كما كانت الفترة بين ولادتين ٣٤٤,٤٤ يوما. أكدت الدراسة على ضرورة الاهتمام بتحسين الكفاءة التناسلية للنعاج البرقى فى هذا القطيع بدلا من الاكتفاء باستبعاد النعاج التى لم تلد. كما أوضحت النتائج أن سنة الميلاد كان لها تأثير عالى المعنوية على كل الصفات المدروسة. تم تقدير المكافئات الوراثية التى تراوحت بين ٠,٢٤ و٠,٣١ للصفات الإنتاجية، مابين٠,٠٧ و ٠,١٦ لصفات طول الحياة وما بين ٠,٠٣ و ٠,١٢ للصفات التناسلية على مدار حياة النعجة. كانت الإرتباطات الوراثية والمظهرية بين صفات طول الحياة والصفات الإنتاجية على مدار حياة النعجة موجبة وعالية المعنوية. كانت صفة وزن الحملان المفطومة على مدار الثلاثة مواسم الأولى ذات مكافئ وراثى معتدل كما كان إرتباطها الوراثى والمظهرى مع الوزن الكلى للحملان المفطومة على مدار حياة النعجة موجبا وعالى المعنوية مما يؤدى إلى التوصية باستخدام هذه الصفة كوسيلة للإنتخاب الغير مباشر لصفة وزن الحملان المفطومة على مدار حياة النعجة. كما اقترحت الدراسة أن الإنتخاب لوزن الحملان المفطومة بعد الموسم الأول قد يؤدى إلى تحقيق نفس الهدف من عمر أكثر تبكيرا.