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EVALUATION OF PERFORMANCE OF DAMASCUS GOAT AND ITS CROSSES WITH EGYPTIAN BALADI AND BARKI

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ABSTRACT

A total of 3108 records on conception rate (CR) and 2123 on litter size (LS) were used in this study. CR data represented 1600 Damascus (D) does, 201 Barki (BR) does, 229 Baladi (BL) does and 1070 crossbred does between D and each of BR and BL, while LS represented 1070 D does, 128 BR does, 145 BL does and 775 crossbred does. These records were used to study the effect of crossing and other fixed effects and to estimate heritability of these two traits in the Damascus goats. Statistical models included varying combination of the fixed effects of station, genotypes within station, year of mating, month of mating, and parity and the random effect of animal nested within station, genotype, year of mating and month of mating. Variance and covariance components for Damascus data were estimated through the Gibbs Sampling technique using a model that included the fixed effects of station, year and month of mating and parity, and the random effects of doe additive genetics and permanent environmental.

CR mean in different analyses ranged from 0.39 to 0.63. Damascus, with a range of CR of 0.48 to 0.63, surpassed both local breeds (ranging from 0.33 to 0.58) and was close to the crossbreds that ranged between 0.34 and 0.68. LS mean ranged from 1.26 to 1.50 in different analyses. Baladi scored the highest in LS (1.49). Damascus ranged from 1.15 to 1.24 in different locations. LS ranged from 1.37 to 1.67 for crossbreds. For both traits there was no clear evidence of the merit of Damascus goats or their crosses over the Barki and Baladi goats. More data taken under sound herd management are needed to clarify the utility of the Damascus and its crosses.

Heritability estimates±SE for CR and LT in Damascus goats were 0.03 ± 0.003 and 0.04 ± 0.003, respectively.

INTRODUCTION

Reproductive traits, such as fertility, prolificacy, fecundity and lamb survival have been recognized as major factors influencing profitability as reported by **Rao (1997). Dickerson (1970)** stated that the cost of animal products depends upon the efficiency of three basic functions, female production, reproduction, and growth of the young. The female production conceptually contributes to all the outputs directly and indirectly from those breeding females that are kept for reproducing next generation. Improving female reproduction performance is an important target for increasing profitability of sheep **(Abdulkhaliq *et al* 1989)** especially in lamb production. Litter size and number of lambs born are considered as two important traits in sheep and goats. Such two traits usually have low heritability and could be affected by many environmental factors such as year and month of mating, season and parity. Such environmental influences can mask genetic

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differences when comparing between animals as reported by **Kennedy (1992)** and they must be controlled and/or corrected to elucidate genetic differences between animals **(Khallouf *et al* 2004).**

Dickerson (1970) stated that there is much greater potential for increasing both biological and economic efficiency of lamb production through genetic improvement in reproductive rate than through improvement in growth rate or body composition. The same can be said for goats. **Rao (1997)** reported that improving fertility could be quite important to successful accelerated breeding systems.

Improving the performance of local breeds of goats through crossing with Damascus goat has been tried in Egypt. Preliminary study by **Abdulla (1990)** indicated that crossing Damascus bucks to Barki does to improve their kid production seemed to be better than using the local Zaraibi bucks.

This work aimed at studying environmental factors affecting conception and litter size at birth in the pure breeds of Baladi, Barki and Damascus goats and to evaluate crosses between the latter and former two in three different locations in Egypt.

MATERIALS AND METHODS

Data

Data in the present study were collected from three experimental stations, Borgelarab, Sakha and Elgemmiza, of the Sheep and Goat Research Department, Animal Production Research Institute (APRI), Egyptian Ministry of Agriculture and Land Reclamation during the period 1982-2006. Damascus goats were imported from Cyprus and raised at Borgelarab station and then some were moved to Sakha station. Damascus bucks were mated to the local Barki does at Borgelarab and to Baladi does at Sakha in an effort to improve the performance of these local breeds. Also a Damascus herd was raised at Elgemmiza station as a pure breed. A total of 3108 records on conception rate (CR) and 2123 on litter size (LS) were used in this study. CR data represented 1600 Damascus (D) does, 201 Barki (BR) does, 229 Baladi (BL) does and 307 crossbred does between D and each of BR and BL, while LS represented 1070 D does, 129 BR does, 144 BL does and 780 crossbred does.

Management

Natural mating was practiced once a year mainly during autumn and winter months for all does but sometime empty does were exposed to bucks out of this period in an effort to maximize kid production. Does were divided into groups of 25-30 each joined with a fertile buck. Kids were weaned at three months of age. Animals were fed on Egyptian clover (*Trifolium alexandrinum*) from December to May. From June to November they were fed on crop stubbles and green fodder if available, besides a concentrate mixture, clover hay and rice straw.

Statistical analysis

Data on CR and LS of does were analyzed using Proc Mixed of **SAS (1996)** with repeated measures. Various models were followed for four alternative sets of data: all Damascus and crosses data, Damascus data, Damascus and crosses data in Sakha station and Damascus and crosses data in Borgelarab station). Gibbs Sampling (GS) techniques were applied to estimate the variance components and genetic parameters of the studied categorical traits for Damascus data. GS Program referring to Monte Carlo Marcov Chain Methods is based on Bayesian methods for the estimation of variance covariance components **(Van Tassell and Van Vleck, 1996).**

The following model was applied for all Damascus and crosses data to obtain estimates for the investigated traits:

$$y_{ijklmno} = \mu + s_i + b_{j(i)} + r_k + m_l + a_{m(ijkl)} + p_n + e_{ijklmno}$$

Where

y_{ijklmn} = record of conception rate (CR) measured as 1 if the doe gave birth and 0 otherwise,

μ = the overall mean,

s_i = the fixed effect of station, i= 1, 2, 3 for Borgelarab, Elgemmiza and Sakha station, respectively,

$b_{j(i)}$ = the fixed effect of genotypes within station, {{j(i) = D, ½D.½BK, ¼D.¾BK, ¾D.¼BK, ⅞D. ⅛BK, for Borgelarab}; D, ¾D.¼BL, ¼ D.¾BL, ½D.½BL, 3/8D. 5/8BL, ⅝D. ⅜BL, 5/8D. 3/8BL for Sakha}; and D for Elgemeza}},

r_k = the fixed effect of year of mating,

k = 1982,.....,2006,

m_l = the fixed effect of month of mating, l = 1,2,.....,12,

$a_{m(ijkl)}$ = the random effect of animal m, nested within station i, genotype j, year of mating k and month of mating l,

p_n = the fixed effect of parity, n =1,2,.....,10,

$e_{ijklmno}$ = random error.

The following model was applied for Damascus data:

$$y_{ijklmno} = \mu + s_i + r_k + m_l + a_{m(ijkl)} + p_n + e_{ijklmno}$$

The definition of terms in the model is as those in the previous model with the absence of the effect of genotypes and some of subclasses for different fixed effects. Mean separations was done using **Duncan (1955)**, to evaluate the differences between locations, parities and month of mating.

The following model was applied for Damascus and cross data in Borgelarab station once and Sakha once more:

$$y_{ijklmn} = \mu + b_j + r_k + m_l + a_{m(ikl)} + p_n + e_{jklmno}$$

The definition of terms is the same as those above.

The following threshold multiple trait model was fitted to estimate variance-covariance components and genetic and phenotypic parameters for CR using BS:

$$Y = X\beta + Zu + e,$$

where,

Y is N.1 matrix of observations of CR,

X is the incidence matrix for fixed effects,

β is the vector of an overall mean and fixed effects of station, year of mating, month of mating and parity,

Z is the incidence matrix for random effects,

U is the vector of random effects of does additive genetic effect and permanent environmental effect for CR of doe and

e is a vector of random errors normally and independently distributed with zero mean and variance $\sigma^2_e I$.

The variance-covariance matrix was as follows:

$$Var\begin{bmatrix} u \\ e \end{bmatrix} = \begin{bmatrix} G & 0 \\ 0 & R \end{bmatrix}$$

where,

G is the additive genetic and permanent environmental variance-covariance matrix,

R is the residual variance-covariance matrix.

The same pervious models were used to analyze litter size (LS) after deleting records with zero conception.

LS and CR were transformed by ARCSIN transformation before the analysis of variance but means and SE were decoded to the original scale shown in different tables.

RESULTS AND DISCUSSION

Least squares means ± standard errors of the studied traits in different levels of fixed effects except year of mating for all Damascus and crosses data are given in **Table (1)**.

Tables (1) and (2) show that no significant difference was observed for CR between different stations. The effects of genotype, parity, month and year of mating on CR were significant **(Table 1).** Damascus showed higher CR than Barki and Baladi goats. In contrast to these results **Abdelsalam *et al* (2000)** showed that conception rate was the highest in Barki does followed by Damascus and then by Zaraibi. In the present study ⅞D.⅛BK and ¾D.¼BK does had much higher CR (0.62 for both) than all purebreds while, ½D.½BK were equal (0.47) to Barki. CR tended to increase from the first to the third parity **(Tables 1 and 2).** Guney et al (2005) reported CR in Damascus in North Cyprus as 70.2% and 80.5% and litter size as 1.62 and 1.56. The highest estimates of CR were recorded in the matings of January, August and September. Damascus crossbreds with Baladi had higher CR than that Damascus crossbreds with Barki **(Tables 3 and 4).**

Least squares means for CR and LS through years 1983 – 2006 for all Damascus and crosses data are presented in **Figure (1)**. LS shows no specific year trend but CR showed a slump during the late eighties and early nineties possibly due to poor management in that period.

Table 1. Least squares means, standard errors (± SE) and probability of type I error (P) across the factor for CR and LS Damascus and all crossbred data.

Factor	No	CR		No	LS	
		Mean±SE	P		Mean±SE	P
Station:			**0.16**			**0.00**
Borgelarab	1387	0.54±0.04		984	1.36±0.04^{a}	
Elgemmiza	427	0.50±0.04		305	1.53±0.04^{b}	
Sakha	1294	0.43±0.11		834	1.54±0.11^{c}	
Genotype(Station):			**0.00**			**0.00**
Barki(BK)(Borgelarab)	201	0.47±0.05^{b}		128	1.41±0.09^{b}	
Damascus(D)(Borgelarab)	280	0.56±0.04^{a}		198	1.39±0.08^{c}	
⅞D*⅛BK(Borgelarab)	69	0.62±0.06^{a}		61	1.44±0.10^{bc}	
½D*½BK(Borgelarab)	211	0.47±0.05^{b}		135	1.37±0.09^{c}	
¼D*¾BK(Borgelarab)	435	0.52±0.04^{ab}		298	1.38±0.08^{c}	
¾D*¼BK(Borgelarab)	191	0.62±0.05^{a}		164	1.37±0.09^{c}	
Damascus(D)(Elgemmiza)	427	0.50±0.04^{ab}		305	1.49±0.00^{b}	
Baladi(BL)(Sakha)	229	0.36±0.05^{c}		145	1.76±0.09^{a}	
Damascus(D)(Sakha)	893	0.44±0.04^{b}		567	1.42±0.08^{bc}	
½D*½BL(Sakha)	164	0.49±0.05^{b}		117	1.67±0.09^{ab}	
Parity:			**0.05**			**0.00**
1	975	0.51±0.05^{a}		690	1.34±0.09^{c}	
2	718	0.52±0.05^{a}		490	1.38±0.09^{bc}	
3	509	0.53±0.05^{a}		358	1.46±0.09^{abc}	
4	369	0.44±0.05^{b}		236	1.45±0.09^{bc}	
5	228	0.47±0.06^{a}		139	1.42±0.10^{bc}	
6	135	0.48±0.06^{a}		94	1.56±0.10^{ab}	
7	81	0.45±0.07^{b}		51	1.34±0.11^{c}	
8	47	0.58±0.08^{a}		34	1.52±0.13^{abc}	
9	23	0.44±0.10^{b}		15	1.67±0.15^{a}	
≥10	23	0.50±0.10^{a}		16	1.62±0.16^{abc}	
Month of mating:			**0.00**			**0.10**
1	15	0.77±0.11^{ab}		11	1.33±0.15	
2	4	0.13±0.22^{c}		1	1.00±0.46	
3	13	0.00±0.0^{c}		2	1.74±0.33	
5	37	0.42±0.08^{b}		18	1.46±0.13	
7	114	0.59±0.06^{ab}		83	1.60±0.09	
8	41	0.75±0.09^{a}		39	1.71±0.11	
9	2653	0.70±0.04^{ab}		1803	1.49±0.06	
10	226	0.56±0.05^{ab}		166	1.49±0.10	

Means followed by different superscripts differ significantly at P<05.

Table 2. Least squares means, standard error (± SE) and probability of type I error (P) across the factor for CR and LS for Damascus data.

Factor	No	CR		No	LS	
		Mean±SE	P		Mean±SE	P
Station			**0.06**			**0.00**
Borgelarab	1036	0.47 ± 0.01 [a]		984	1.48±0.08 [a]	
Elgemmiza	426	0.46 ± 0.01 [a]		305	1.62±0.08 [a]	
Sakha	1296	0.40 ± 0.01 [a]		834	1.44±0.13 [a]	
Parity			**0.06**			**0.00**
1	975	0.44±0.05 [ab]		690	1.37±0.10 [ab]	
2	717	0.47±0.06 [ab]		490	1.41±0.10 [ab]	
3	510	0.49±0.06 [ab]		3581	1.50±0.10 [ab]	
4	369	0.41±0.06 [ab]		2361	1.49±0.10 [ab]	
5	228	0.47±0.06 [ab]		139	1.51±0.10 [ab]	
6	135	0.39±0.07 [ab]		94	1.61±0.12 [ab]	
7	81	0.35±0.08 [b]		51	1.37±0.13 [b]	
8	47	0.62±0.09 [a]		34	1.56±0.14 [a]	
9	23	0.34±012 [b]		15	1.69±0.18 [b]	
≥ 10	23	0.45±0.14 [ab]		16	1.62±0.22 [ab]	
Month of mating			**0.00**			**0.03**
1	15	0.46 ± 0.16 [abc]		11	2.24 ± 0.27 [abc]	
2	4	0.17 ± 0.21 [c]		1	0.89 ± 0.47 [c]	
3	13	0.28 ± 0.24 [bc]		2	2.13 ± 0.47 [bc]	
5	37	0.20 ± 0.09 [bc]		18	1.11 ± 0.24 [bc]	
7	114	0.34 ± 0.13 [bc]		83	1.59 ± 0.20 [bc]	
8	41	0.89 ± 0.19 [a]		39	1.28 ± 0.22 [a]	
9	2657	0.74 ± 0.02 [ab]		1803	1.42 ± 0.03 [ab]	
10	227	0.47 ± 0.05 [abc]		166	1.45 ± 0.08 [abc]	

Means followed by different superscripts differ significantly at P<05

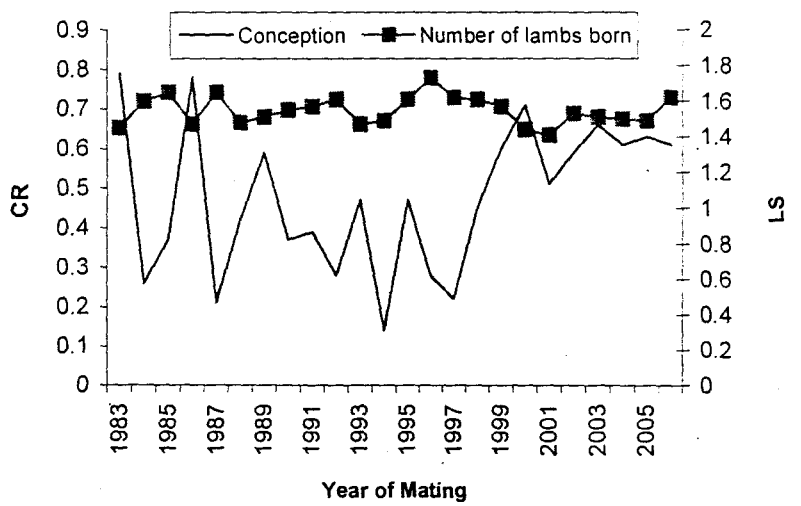

Figure 1. Least squares means of CR and LS for all Damascus and crossbreds data

Least squares means ± standard errors for CR and LS in different levels of fixed effects except year of mating for Damascus data are given in **Table (2).**

Least squares means for CR and LS through years 1983 – 2006 for Damascus data are presented in **Figure (2).** As the case for the whole set of data, Damascus data show a slump during the early nineties for CR but no specific trend is observed for LS.

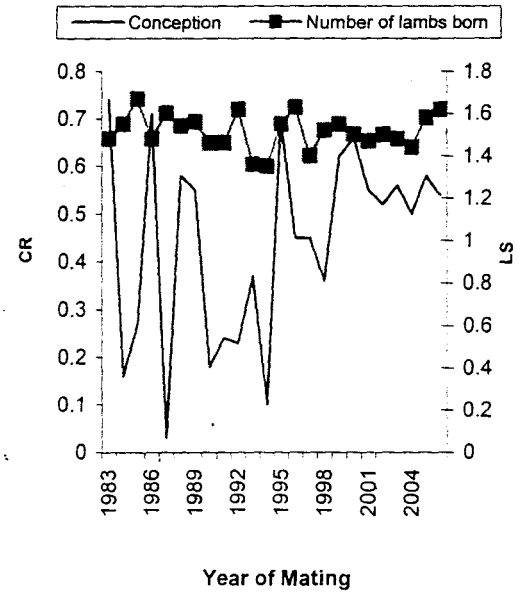

Figure 2. Least squares means of CR and LS for Damascus data

Table (1) shows significant differences in LS of does attributed to station, genotype and parity. LS ranged from 1.38 for Barki to 1.68 for Baladi with majority of their crosses with Damascus scoring higher LS than the pure Damascus. The effect of breed on LS was in good agreement with the findings of **Amoah *et al* (1996) and Guney *et al* (2005).** LS increased with the order of parity with a drop at the fifth and seventh parity. The influence of genotype and parity was non significant on LS in Borgelarab station, while it was highly significant in Sakha station **(Tables 3 and 4).** LS was not significantly affected by month of mating in both stations. LS tended to increase in ninth and tenth parities **(Tables 1, 2, 3 and 4).**

Least squares means ± standard errors for CR and LS in different levels of fixed effects for Damascus and crossbreds in Borgelarab data are given in **Table (3).**

Table 3. Least squares means, standard error (± SE) and probability of type I error (P) for CR and LS for Damascus and crosses data in Borgelarab station.

Factor	No	CR Mean±SE	P	No	LS Mean±SE	P
Genotype:			**0.09**			**0.92**
Barki(BK)	201	0.33 ± 0.08		128	1.26 ± 0.11	
Damascus (D)	279	0.48 ± 0.07		198	1.24 ± 0.11	
⅞D . ⅛BK	69	0.40 ± 0.09		61	1.32 ± 0.13	
½D . ½BK	211	0.34 ± 0.07		135	1.26 ± 0.11	
¼ D . ¾BK	435	0.37 ± 0.07		298	1.24 ± 0.11	
¾D . ¼BK	191	0.41 ± 0.08		164	1.24 ± 0.12	
Parity:			**0.00**			**0.16**
1	445	0.47 ± 0.07^{ab}		352	1.14 ± 0.10	
2	316	0.45 ±0.07^{abc}		231	1.19 ± 0.10	
3	227	0.46 ±0.07^{abc}		127	1.22 ± 0.11	
4	187	0.41 ±0.07^{abc}		119	1.22 ± 0.11	
5	95	0.36 ± 0.08^{bc}		53	1.15 ± 0.12	
6	49	0.35 ± 0.09^{bc}		29	1.35 ± 0.13	
7	28	0.32 ± 0.10^{bc}		16	1.23 ± 0.15	
8	15	0.25 ± 0.12^{c}		8	1.22 ± 0.19	
9	8	0.41 ±0.15^{abc}		6	1.42 ± 0.21	
≥ 10	16	0.41 ± 0.12^{a}		13	1.45 ± 0.17	
Month of mating:			**0.00**			**0.54**
1	1	0.07 ± 0.40^{c}		na.	na	
2	4	0.38 ± 0.21^{bc}		1	0.97 ± 0.46	
3	13	0.00 ± 0.0^{c}		2	0.99 ± 0.35	
5	14	0.70 ± 0.12^{a}		14	1.40 ± 0.14	
7	114	0.52 ± 0.08^{ab}		83	1.51 ± 0.09	
8	41	0.65 ± 0.16^{a}		39	1.31 ± 0.19	
9	1102	0.70 ± 0.03^{ab}		753	1.35 ± 0.05	
10	47	0.16 ± 0.16^{a}		92	1.27 ± 0.43	

Least squares means for CR and LS through years 1983 – 2006 for Borgelarab station data presented in **Figure (3)** show no specific trend.

Least squares means ± standard errors for Damascus and crossbred in Sakha data are given in **Table (4).**

Least squares means for CR and LS through years 1983 – 2006 for Sakha station data presented in **Figure (4)** show no specific trend.

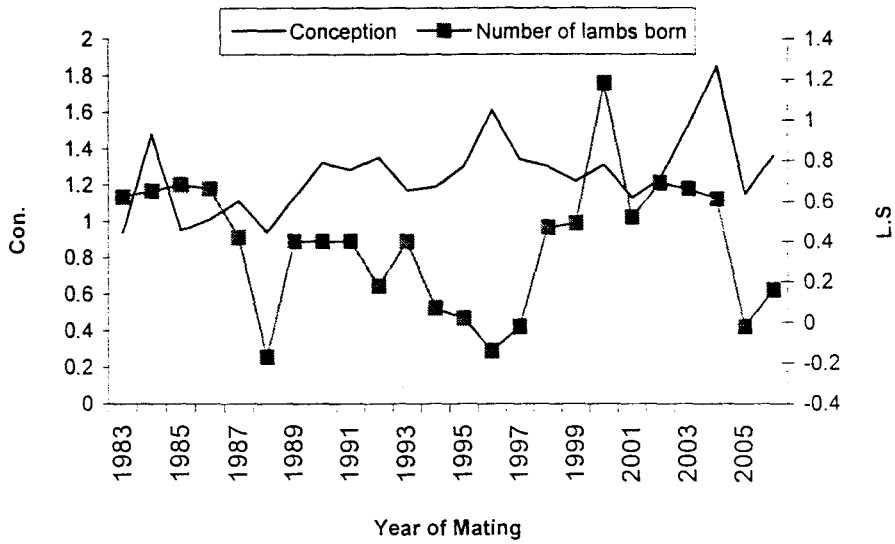

Figure 3. Least squares means of CR and LS for Borgelarab station

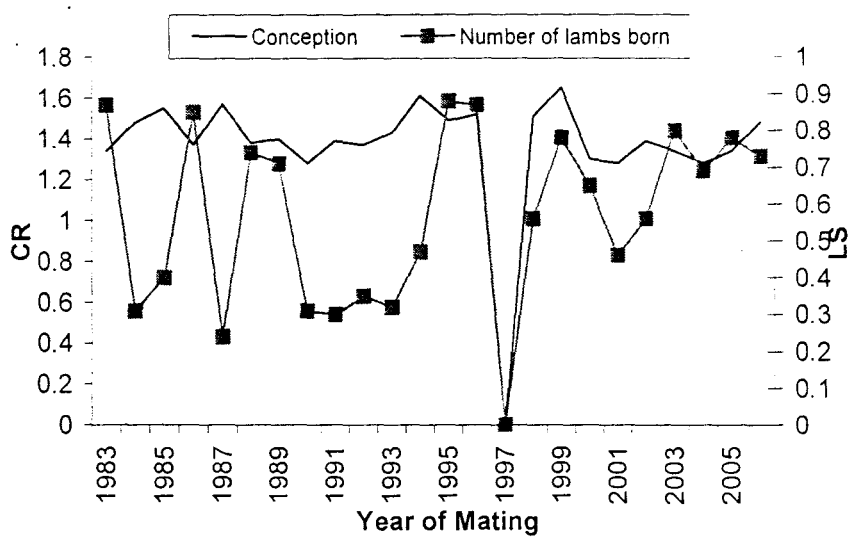

Figure 4. Least squares means of CR and LS for Sakha station.

Table 4. Least squares means, standard error (± SE) and probability of type I error (P) across the factor for CR and LS Damascus and all crossbred in Sakha station.

Factor	No	CR		No	LS	
		Mean±SE	P		Mean±SE	P
Genotype			**0.20**			**0.00**
Baladi(BL) (Sakha)	230	0.58 ± 0.01		144	1.49 ± 0.18^{ab}	
Damascus (D) (Sakha)	893	0.63 ± 0.01		567	1.15 ± 0.17^{b}	
½D . ½BL (Sakha)	164	0.68 ± 0.01		117	1.41 ± 0.18^{ab}	
Parity			**0.29**			**0.00**
1	415	0.62 ± 0.11		258	1.22 ± 0.01^{ac}	
2	303	0.68 ± 0.11		186	1.16 ± 0.01^{c}	
3	217	0.72 ± 0.11		152	1.33 ± 0.01^{abc}	
4	142	0.63 ± 0.12		90	1.38 ± 0.01^{abc}	
5	101	0.70 ± 0.12		64	1.35 ± 0.01^{abc}	
6	64	0.65 ± 0.12		47	1.45 ± 0.01^{ab}	
7	42	0.57 ± 0.13		26	1.19 ± 0.01^{bc}	
8	22	0.80 ± 0.14		19	1.59 ± 0.01^{a}	
9	10	0.72 ± 0.17		7	1.47 ± 0.01^{ab}	
≥ 10	1	0.19 ± 0.43			na.	
Month of mating			**0.00**			**0.32**
1	11	1.07 ± 0.17^{a}		11	1.43 ± 0.18	
2	na	na		na	na	
3	na	na		na	na	
5	17	0.15 ± 0.15^{c}		1	1.03 ± 0.52	
7	na	na		na	na	
8	na	na		na	na	
9	1289	0.68 ± 0.11^{b}		837	1.60 ± 0.11	
10	na	na		na	Na	

.na= not available.
Means followed by different super scripts differ significantly at P<05.

As an approximate indication of heterotic effects, when the means weighed by their respective proportion of genetics from the two breeds was subtracted from actual mean of crossbreds, for CR, differences were all positive but that for 1/2D*1/2BK when all data considered with station included in the model and all negative but that for 1/4D*3/4BK in the analysis of Borgelarab data. As for LS, all values were negative except that for 7/8D * 1/8BK and 1/2D*1/2BL in the analysis of the full data set and that of 7/8D*1/8BK at Borgelarab and Damascus halfbreds at Sakha and Borgelarab.

Heritability estimates for LS and CR in Damascus in the present data are quite low, being 0.04±0.003 and 0.03±0.003, respectively. These results are in disagreement with the higher estimates reported by **Bagnicka *et al* (2006) and Odubote (1989)** of 0.35 for litter size, while in agreement with **Constantinou (1988)**.

CONCLUSION

The rather low mean conception rate in four runs ranging from 0.39 to 0.63 reflects serious defects in the management of these herds which could render breed/cross comparisons valueless. However, litter size was generally what is expected. In conception rate, Damascus surpassed both local breeds and was close to the crossbreds but generally the opposite was true for litter size. In view of the varying results of the merit of the crossbreds in both traits and the possible presence of genotype by station interaction, no conclusion could be reached regarding the use of Damascus in crossing Baladi and Barki goats.

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تقييم أداء الماعز الدمشقى وخلطانها مع الماعزالبلدى والبرقى المصريتين

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استخدمت في هذه الدراسة بيانات عـــن ٣١٠٨ سجل على صفة معدل الحمل لعـــدد ١٦٠٠ عنـــزة دمشقي و عنزة ٢٠١ برقـــي وعنـــزة ٢٢٩ بلـــدي و١٠٧٠ عنزة خليطة (خلـــيط دمـــشقي مـــع بلـــدي ودمشقي مع برقي). وكذلك بيانات عن ٢١٢٣ سجل لصفة عدد الجديان المولودة لعدد ١٠٧٠ عنزة دمشقي و١٢٨ عنزة برقـــي و١٤٥ عنزة بلدي و ٧٧٥ عنزة خليطة. استخدمت هذه السجلات لدراســـة تأثيـــر الخلط والعوامل الثابتة الأخري على هاتين الصفتيـــن ولتقدير المكافئ الوراثي لهما فـــي بيانـــات المـــاعز الدمشقي.

اشتملت النماذج الإحصائية المختلفة علـــى تـــأثير العوامل الثابتة للمحطة والتركيـــب الـــوراثى داخـــل المحطة وسنة وشهر التـــزاوج والموســـم والتـــأثير العشوائى للحيوان داخل التركيب الـــوراثى للمحطـــة وسنة وشهر التزاوج .

قدرت مكونات التباين لبيانات الدمشقى باســـتخدام معاينة Gibbs باستخدام نموذج اشـــتمل علـــى تـــأثير المحطة وسنة وشهر التـــزاوج والموســـم والتـــأثير الوراثي التجمعي للعنزة والتأثير البيئى الدائم .

تراوح متوسط معـــدل الحمـــل فـــي التحلـــيلات المختلفة بين ٠,٣٩ الي ٠,٦٣ . وتـــراوح متوســـط معدل الحمل في الدمشقي مـــن ٠,٣٥ الـــي ٠,٦٣ ؛ وكان هذا المعدل أعلي منه في الـــسلالات المحليـــة والتي تراوحت في هذه الصفة بين ٠,٣٣ الي ٠,٥٨ . وقد اقتربت قيم هذه الصفة في الدمشقي من الخلطان التي تراوحت قيمها بين ٠,٣٧ الي ٠,٦٨.

أما صفة عدد الحملان المولـــودة فقـــد تـــراوح متوسطها بين ١,٢٦ الي ١,٥٠ وسجلت سلالة البلدي أعلي متوسط في هذه الصفة (١,٤٩). وتراوحت قيمة هذه الصفة في الدمـــشقى مـــن ١,١٥ الـــي ١,٣٩. تراوحت هذه الصفة فى الخلطان مـــن ١,٣٧ إلـــى ١,٦٧ في المحطات المختلفة . ولا يوجد ما يثبـــت تفوق الدمشقى أو خلطانها مع البلدى والبرقى علـــى السلالات المحلية فى كلتا الصفتين معا، والمطلـــوب استخدام أعداد أكبر من الحيوانات تحت نظم رعايـــة أفضل لكي تتضح مدي أفـــضلية المـــاعز الدمـــشقي وخلطانها.

وقدر المكافئ الوراثة لصفتى معدل الحمل وعـــدد الجديان المولودة فى الماعز الدمـــشقى بـــ ٠,٠٣± ٠,٠٠٣ و٠,٠٤ ± ٠,٠٠٣ ، على التوالى.

تحكيم: ا.د السيد صلاح الدين جلال