Some Genetic and Non-genetic Causes of Variation in Milk Traits of Iraqi Local Goat

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SUMMARY

Genetic and non-genetic factors affecting pre-weaning (PMY), post-weaning (AMY), total milk yield(TMY), lactation period (LAP), peak milk yield (PKY) and time to peak (TPK) were investigated. Results revealed that there was no significant effect of does age and sex by litter size on all studied traits. Season of kidding had a significant effect ($P<0.01$) on AMY, TMY, LAP and TPK. Does coat color was significantly ($P<0.05$) affected PMY. No differences between horned and polled does were found in milk traits. Regression of PMY on doe weight at kidding was highly significant and being 1.22 kg/kg. Correlation coefficients among milk traits were all positive and ranged between 0.05 and 0.78.

Keywords: Goat, Milk, Coat color.

INTRODUCTION

There is a sizeable gap between actual and potential productivity of small ruminants in farming system . Johnson et al.(1986) suggested that there is untapped potential for improving the productivity of goats in developing countries. In Iraq, no systematic attempt has been made to study the production of local goat for milk and meat under semi-intensive system. The objective of this study is to evaluate local goat for some dairy characters.

MATERIALS AND METHODS

The base local goat population used in this study was established in 1993. The animals were collected randomly from farmers at different places around Baghdad, and was kept at Agargouf Goat Breeding Station. The study utilized records of milk yield, of 169 does, measured at

weekly intervals. The higher test-day milk yield for each doe was considered as the peak, and that date was considered TPK. Maximum Likelihood method (Schaeffer 1976), was used to determine sources of variation affecting PMY, AMY ,TMY, LAP,PKY and TPK. The model included age of doe, season, sex by litter size, color of doe, presence or absence of horn and doe weight at kidding as a covariate.

RESULTS AND DISCUSSION

The overall TMY was 98.0 kg reached PKY(1.012 kg) by the LAP extended up to 172.9 days (Table 1). The CV of PMY (36.83%), AMY (83.55%), TMY (44.07%), LAP (15.89%), PKY (43.34%) and TPK (77.30%) indicated that the variability of milk traits of local goats were high and give good opportunity for genetic improvement within flock via selection.

Age effect: Although, the differences between does of different ages were not significant(Table 1), does aged 6 years and older had higher TMY (102.4 kg), higher PMY (70.9 kg), higher AMY (44.9 kg) and higher peak (1.077 kg). Ehoche and Buvanendran (1983) showed a similar effect of age of doe on cumulative milk yields.

Season effect: Table 1 reveals that does kidding in winter had significantly ($P<0.01$) higher TMY, AMY, LAP and TPK than does kidding in spring season. Similar results were found by Kennedy et al. (1981), Blackburn and Field (1990) and Montaldo et al.(1995).

Sex by litter size effect: Sex by litter size did not influence all traits studied except PMY, where does rearing female twin or mixed twin produce significantly higher milk than those rearing female single. Montaldo et al.(1995) reported that litter size was significantly related to TMY. However, greater milk production in goats with two or more kids can be explained by increased level of placental lactogen in goats having multiple kids (Hayden et al. 1979).

Does coat color effect: Does coat color affected (P<0.05) PMY, where does with spotty coat color produced higher PMY and had shorter LAP than those with black coat color (Table 1). Does with white coat color exceeded others in TMY, AMY, PKY and TPK.

Presence of horn: Differences between horned (95.4 kg) and polled (94.2 kg) does were not significant in TMY. Similar trend was noticed for LAP (168.6 vs. 170.7 days), PKY (0.977 vs. 0.982 kg) and TPK (8.1 vs. 8.7 week) for horned and polled does, respectively.

Doe weight at kidding: Weight of doe at kidding had a significant effect on PMY with a regression coefficient of 1.22 kg/kg. On the other hand, the regressions of other traits on weight of doe lacked significance.

Positive and significant correlations were found between PMY and each of AMY(0.30), TMY(0.77), LAP(0.21) and PKY(0.69), between AMY and each of TMY(0.78), LAP(0.40), PKY (0.58)and TPK (0.28), between TMY and each of LAP(0.53), PKY(0.72) and TPK (0.29), and between LAP and TPK (0.42). Ehoche and Buvanendran(1983) reported that correlations between TMY and PMY were significant (P<0.01). Montaldo et al.(1995) also reported that correlation between TMY and LAP was highly significant.

It is concluded that, 1) the variability in milk production is sufficient for selection to operate effectively. However, further investigations for genetic parameters are needed. 2) Neither, coat color nor presence or absence of horns has any peliotropic effect on milk traits. 3) Milk yield in loca goat under semi-intensive farming system was far below the average of dairy goats.

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Table 1. Least-square means, standard errors and mean square for the factors affecting pre-weaning(PMY), post-weaning(AMY), total milk yield(TMY), lactation period(LAP), peak milk yield(PKY) and time to peak (TPK)

Factors	PMY(kg)		AMY (kg)			TMY(kg)	LAP(day)	PKY (kg)	TPK(week)
	D.F. or No.	Meansquare or Mean ± S.E.	D.F. or No.	Mean square or Mean ± S.E.	D.F. or No.	Mean square or Mean ± S.E.	Mean square or Mean ± S.E.	Mean square or Mean ± S.E.	Mean square or Mean ± S.E.
Overall mean	135	64.5±2.2	156	43.7±3.1	169	98.0±3.7	172.9±3. 2	1.012±0.01	9.0±0.6
Coefficient of variation:		36.83		83.55		44.07	15.89	43.34	77.30
Age of doe (year):	4	210.69	4	931.89	4	614.44	187.51	0.142	28.053
2	5	65.7±11.5a	8	25.9±14.4a	8	84.7±16.9a	176.8±10.7a	0.765±0.17 b	7.2±2.7 a
3	37	68.7±4.8 a	44	33.9±6.8 a	47	96.7±7.8 a	166.8±4.9 a	1.013±0.08 ab	7.2±1.3 a
4	21	69.0±5.9 a	25	42.4±8.5 a	27	95.8±9.6 a	166.8±6.1 a	1.005±0.10 ab	9.3±1.5 a
5	34	63.9±4.6 a	37	34.5±6.8 a	39	94.4±7.9 a	169.5±5.0 a	1.039±0.08 ab	9.3±1.3 a
6 and older	38	70.9±4.4 a	42	44.9±6.7 a	48	102.4±7.3 a	168.5±4.6 a	1.077±0.07 a	8.9±1.2 a
Season :	1	1904.05	1	18334.4 **	1	56475.4 **	129759.2 **	0.004	616.21 **
Winter	78	71.9±4.3 a	91	49.1±6.0 a	92	115.5±6.9 a	200.9±4.4 a	0.985±0.07 a	10.5±1.1 a
Spring	57	63.4±4.1 a	65	23.5±6.0 b	77	74.1±6.6 b	138.4±4.2 b	0.974±0.07 a	6.2±1.1 b
Sex by litter size:	4	1141.27	4	84.66	4	977.93	588.85	0.138	22.956
Female single	42	57.5±4.4 b	52	36.6±5.9 a	55	87.6±6.7 a	164.6±4.3 a	0.949±0.07 a	8.5±1.1 a
Female twin	12	75.3±7.6 a	12	32.2±11.3 a	13	97.5±12.9 a	167.9±8.2 a	1.066±0.13 a	6.2±2.1 a
Male single	48	67.9±4.4 ab	52	37.8±6.4 a	57	97.9±7.3 a	170.6±4.6 a	0.978±0.07 a	8.7±1.2 a
Male twin	12	65.5±7.6ab	14	36.9±10.9 a	16	91.5±12.1 a	169.5±7.7 a	0.846±0.12 a	9.3±1.9 a
Mixed twin	21	72.0±5.9 a	26	38.2±8.3 a	28	99.5±9.3 a	175.8±5.9 a	1.059±0.09 a	9.2±1.5 a
Color of doe:	3	1549.8 *	3	1569.9	3	763.65	895.18	0.11	8.455
Black	42	57.6±4.7 b	54	40.1±6.2 a	57	89.1±7.1 a	175.1±4.5 a	0.920±0.07 a	8.6±1.1 a
Brown	62	67.7±3.9 ab	67	40.3±5.6 a	74	96.6±6.4 a	171.8±4.1 ab	0.981±0.07 a	8.4±1.0 a
White	19	66.2±6.2 ab	25	45.6±8.2 a	26	100.0±9.6 a	173.4±6.1 ab	1.065±0.10 a	9.2±1.5 a
Spotty	12	79.0±7.5 a	10	19.4±12.2 b	12	93.6±13.3a	158.4±8.5 b	0.952±0.14 a	7.4±2.1 a
Presence of horn:	1	0.34	1	464.1	1	8.23	164.81	0.001	11.06
Horned	86	67.6±3.8 a	96	34.5±5.5 a	105	95.4±6.3 a	168.6±3.9 a	0.977±0.06 a	8.1±1.0 a
Polled	49	67.7±4.4 a	60	38.2±6.0 a	64	94.2±6.9 a	170.7±4.4 a	0.982±0.07 a	8.7±1.1 a
Regression on doe weight at kidding:	1	6921.02 **	1	4105.4	1	2218.1	551.54	0.575	52.725
	135	1.22±0.35	156	-0.93±0.53	169	0.65±0.6	-0.324±0.4	0.010±0.006	-0.1±0.09
Error	120	564.72	141	1333.6	154	1863.65	755.29	0.192	48.02

Means not having a common letter within each column differ significantly (P<0.05) ; * P<0.05 ; ** P<0.01