

Comparison of Weight Gain, Milk Production, and Milk Composition of Iranian Mamasani Goat and its Cross with Saanen

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Abstract

Crossbreeding can be a breeding strategy to facilitate genetic improvement in native goat production. For this purpose, the performance of weight gain, milk production and milk composition of native Mamasani goat with Mamasani goat × Saanen (F₁) as crossed goat breed during 2012 to 2014 years were compared. According to the results, effect of genetic groups on birth weight (BW) was not significant but Weaning weight (WW) was significant (P <0.05). The average birth weight and weaning weight for native Mamasani and crossed F₁ goats were 2.85 ± 0.23; 2.98 ± 0.19 and 9.52 ± 0.28; 11.61 ± 0.28 respectively. Milk yield in crossed F₁ goats differed from Mamasani goats significantly, however milk composition in term of milk fat and milk protein content decreased significantly (P <0.05). The average daily milk records were 0.65 ± 0.05 kg for Mamasani goats, and 1.31 ± 0.12 kg for crossed F₁ goats respectively. These findings indicated that crossbreeding of native goats with Saanen had positive effects on performance traits such as weight gain and milk yield but could not improve the milk composition traits including fat and protein content.

Keywords: Goat; Mamasani Saanen; Milk production; Milk composition

Introduction

The performance of native Iranian goats is said to be adequate in terms of meat and hair production, although poor with regard to milk yields, probably because of unfavorable conditions [1]. Cross-breeding with Saanen goats promises improvements in milk production and growth rates, but the rearing performance and meat production ability of the native goats needs further evaluation [2]. There is a great potential for development of milk production from goats and recently projects for this purpose have been established in Iran [3]. These research projects are mainly concerned with evaluating milk production from native and crossbred goats [1]. Crossbreeding has the benefit of heterosis, as an initial stage of transition in establishing a breed which means "grading up" for the development of a new breed. The use of established dairy breeds for upgrading low producing or nondescript breeds for milk production is particularly relevant in unfavorable environments [2,4,5]. Whether up-grading or the development of a new breed is the best policy will depend on the environment and level of management [4]. The option of crossbreeding to introduce suitable genetic material for milk production is a much more rapid method than that of attempting to improve yield of native goat breeds by selection [6,7]. Crossbreeding results in heterosis for milk production and weight gain as it is apparent when the average performance of crossbred progeny is superior to the average performance of the two parents [8,9]. Mamasani goat is a native goat in Iran located in central regions of Iran. This breed of goat was kept to produce of fluff and milk, hair [1]. In this regard we described in the present study the futures of native Mamasani goat and its crosses with Saanen breed and evaluate the present and potential milk production capacity and weight gain of the existing native and imported goats stock.

Materials and Methods

In this study all animals were fed hay, wheat straw and concentrate with 12% protein. Number of 94 Mamasani goats and 37 Mamasani × Saanen (F₁) were selected at a local farm in south of Qom province. Weights of experimental animals were recorded

and weight gain data were adjusted regards to birth date and birth type according to birth date and birth type using Least Square Means (LSM) calculating procedures included Birth Weight (BW) and Weaning Weight (WW) of related kids. Raw milk samples ($n = 140$) were obtained hygienically during 5 month lactation period and stored at 5 °C before analysis. Milk composition included fat and protein were analyzed by Milk Scope Julli C2 auto-analyzer in a laboratory of animal hospital in Qom city. Data were analyzed statistically using T-student procedure. P-values less than 0.05 were statistically significant. Estrus Synchronization and artificial insemination technology were used for Mamasani native goats and Saanen \times Mamasani goats (F_1).

Results and Discussion

Birth body weights were similar between Mamasani and crossed F_1 , when compared with those of previous reports, this finding indicated that there is no similarity with the findings of other researchers [4]. Hoseini *et al.* (2012) reported differences in birth weights of black Lori goats and their crosses with Saanen. The results depicted in Table 1 related to weaning weight indicated that weaning weight of kids increased ($P < 0.05$) the P-value indicates the difference is significant. These finding were in line with other results [1,5,6]. The average of daily milk records were 0.65 ± 0.05 kg and 1.31 ± 0.12 kg for native and crossed F_1 respectively. These significant results were similar to the latest research about native black Lori goat \times Saanen in Qom province. When the results of this study are compared with the results of previous research, it is found that they are very close to related findings, which reported significant differences between native with crossed goats, and confirmed the positive effects of crossbreeding on milk yield traits directly [4,5,7]. In this study the milk yield increased significantly, however milk composition in term of milk fat and protein decreased through crossbreeding (Table 2). Although reduction in milk composition of crossbred offspring is a normal phenomenon due to negative correlation between quantitative and qualitative traits through animal breeding [2,7]. In this study, the reduced milk quality maybe due to higher quantity of the milk produced by crossbred goats. Guzler *et al.* (2010) also reported significant reduction in milk composition in Turkish native goat (Kilis) when crossed with Saanen [10].

Body weight (kg)	Mamasani Goat	Crossed F_1
Birth Weight	2.85 ± 0.23	2.98 ± 0.19
Weaning Weight	9.52 ± 0.28^b	11.61 ± 0.28^a

^{ab}Superscript letters within the same row are significantly different ($P < 0.05$)

Table 1: Average of body weight of Mamasani goat and their crosses with Saanen

	Mamasani Goat	Crossed F_1
Milk yield	0.65 ± 0.05^a	1.31 ± 0.12^b
Fat%	4.85 ± 0.13^a	3.91 ± 0.11^b
Protein%	4.12 ± 0.03^a	3.6 ± 0.15^b

^{ab}Superscript letters within the same row are significantly different ($P < 0.05$)

Table 2: Average of milk yield (L/day) and Composition of Mamasani goat and their crosses with Saanen

Other reports indicated that crossbreeding of native goats with genetically modified goats resulted in improved performance traits such as milk and gain traits [5,10,11]. Moameni *et al.* (2012) reported that crossbreeding between Sahelian goats with Anglo-Nubian goats improved their growth rate and milk production.

Conclusion

According to the results of present study we can demonstrate that weight gain and milk production traits of crossed goats were improved after crossbreeding of native Mamasani goat \times Saanen. Also milk yield in crossed F_1 goats increased significantly compare to Mamasani goats, however milk composition (fat and protein percentage) decreased significantly. These findings indicated that crossbreeding of native goats with Saanen had positive effects on performance traits such as weight gain and milk yield.

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