

Body Weight Changes of Non-dairy Rembi Sheep During Lactation Period in Tiaret District, Algeria

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Abstract: Thirty-two *Rembi* ewes of 40 months and 52 kg mean age and weight, respectively, were used in the present study. Milk production was estimated using oxytocin plus hand milking method, control started on day 14 *postpartum* and continued every 14 days until day 112. Lactation curve peaked at 2nd week, estimated mean daily milk yield (DMY) and total milk yield (TMY) were 557.3 ± 203 g and 60.4 kg, respectively; with a large coefficient of variation (36.4 %) in DMY. Maximum body losses (up to 4 kg, $p = 0.009$) has occurred in the first 7 lactation weeks, then, body weight recovery has started from 3rd lactation month. Also, no relationship was found between body weight changes (BWC) and DMY throughout lactation period ($r = 0.05$). Results showed that TMY estimated by OHM method was low, resulting in moderate BWC. Therefore, feed improvement could limit weight loss.

Key words: Rembi Sheep • Milk Yield • Body Changes • Algeria

INTRODUCTION

The contribution of body reserves to food balance sheet in difficult time can play an important role in the global efficiency of production, quite particularly in Mediterranean environment where the alternation of periods of abundance and fodder scarcity is very frequent [1].

In dairy and suckling ewes, the lactation beginning is under the influence of sucking or partial milking which stimulate milk ejection [2]. However, milk production is also under the influence of feeding [3]. Therefore, during lactation period, ewe needs are highest and nutrition plan is one of the most important factors influencing milk yield [4]. In the first lactation weeks, the ewe cannot support milk production needs, despite the fast increase of ingestion capacity [5, 6]; thus, poor feed supply at this time would be associated with increased weight losses [3, 6, 7]. Live weight recovery observed during the last lactation phase is due to production decline [5]. A favorable nutrition plan results in little body weight changes during lactation and provide the opportunity for ewes to express their lactation potential [4].

Furthermore, condition score is used internationally to estimate the energy status or nutritional well being of adult ewes and its appropriate alternative to live weight for managing the nutritional profile of ewes [8], but the magnitude of the live weight difference per unit of body condition score (BCS) varies widely in the same and between different sheep breeds [9].

Many studies were conducted in *Rembi* sheep breed to investigate reproduction behavior [10, 11]; health state [12, 13] and production performance [14], however, none have focused on body changes in lactating ewes.

The aim of this study is to assess live body weight variations in relation to milk production, in semi-intensive feeding system of local *Rembi* sheep breed throughout the suckling period.

MATERIALS AND METHODS

Study Area: This study was conducted at experimental farm, located in Tiaret district (Western Algeria), 35°31' latitude North, 1°1' longitude East and elevation 620 meters.

Sheep Farming and Feeding: Thirty-two multiparous *Rembi* ewes rearing single lambs, aged about 40 months and weighed 52 kg on average, had been used during the period from December 2012 to May 2013. During last 8 weeks of gestation, ewes have received daily a regime of 500 g/head of barley grain and wheat straw *ad libitum*. Lactating ewes diet contained ground barley (500 g day⁻¹/head), wheat bran (400 g day⁻¹/head), wheat straw (500 g day⁻¹/head) and 1% of vitamins-mineral premix and fresh water provided once in the morning.

Data Collection and Statistical Analysis: Milk measurements started on day 14 after lambing and continued every 14 days until the 112th day. Oxytocin injection plus hand milking method (OHM) was used to estimate milk yield [15]. On test day, lambs were separated from their mothers; the ewes received 10 IU of oxytocin via intra jugular vein and udder was hand milked rapidly. Milk yield obtained at the second udder emptying (After 6 hours) was multiplied by four to determine the 24 hours production and total milk yield was calculated according to *Fleishman* method [16]. Daily milk yield recorded in the first control (d14) was extrapolated to the seventh day after birth.

Ewes were weighed at lambing and every week until the end of the experiment, before feeding, using an electronic scale of 100 g precision.

Data were analyzed using STATISTICA 8.0 software [17] to compare body weight at different periods of lactation with Student's test. Correlation between milk production and live weight changes was characterized by correlation test.

RESULTS AND DISCUSSION

Milk Production: Lactation peak of 968 ± 327 g was observed on the 2nd week. Estimated total milk yield and mean daily milk yield (DMY), throughout lactation period, were 60.4 kg and 557.3 ± 203 g, respectively; showing a high coefficient of variation in DMY (36.4 %). DMY has decreased during lactation period (Figure 1) and a level of 284 ± 164 g was observed at final control. Milk production level of *Rembi* sheep achieved in this study was low, similar to that obtained with some Moroccan indigenous sheep breeds (*Timahdit* and *Beni-Ghil*); confirming meat purpose of such breeds [18].

Feeding is a determining factor in milking performance; low feed intake seems to be the major reason for low milk production and improved feeding increases

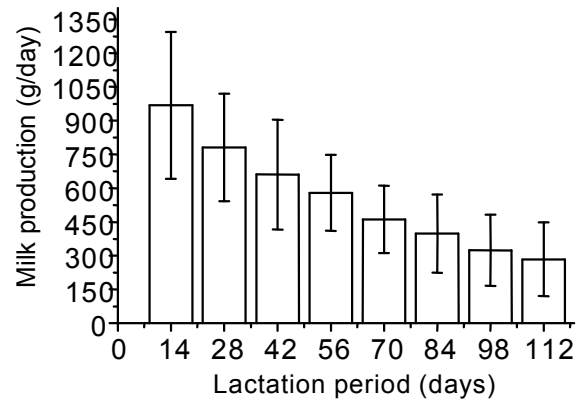


Fig. 1: Milk production per 14 days intervals.

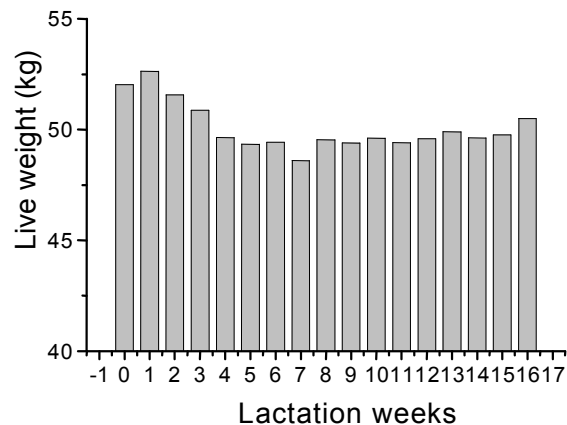


Fig. 2: Live weight changes during whole lactation period.

production [19-23]. On the other hand, the large variation coefficient in DMY implies that selection can improve *Rembi* milk performance [24].

Ewes Body Weight Changes: Live weight change values recorded during lactation period are shown in table 1. Despite weight losses occurring at lambing (Expulsion of lambs and placenta), ewes showed slight weight gain (0.588 kg) in the first week of lactation period, which seems to be related to feed supplement insured during the 8 last weeks of gestation. These results are in agreement with those of Thompson *et al.* [25] and Hamada *et al.* [26], who observed that enhancing feeding in pregnant ewes allowed them to gain weight. Important body losses have occurred during the first 7 weeks postpartum (Figure 2) and were highly significant (4 kg; $p = 0.009$), representing 7.6 % of live weight (LW); within recommended INRA ranges of at most one BCS unit [6]. Significant decrease of mean body weight (3.280 kg; $p = 0.045$) has occurred in first month of lactation as reported by many authors [27-29], this is explained by the maximum production

Table 1: Daily evolution of milk production and body weight changes during suckling period.

Lactation month	1	2	3	4
Daily milk yield (g/day)	874 ± 283	620 ± 206	430 ± 161	304 ± 161
Mean live weight (kg)	49.64 ± 5.9	49.54 ± 5.9	49.6 ± 6.2	50.5 ± 6.3
Live weight change (kg)	- 3.280	- 0.100	+ 0.066	+ 0.894
Live weight change (g/day)	- 109.3	- 3.3	+ 2.2	+ 29.8

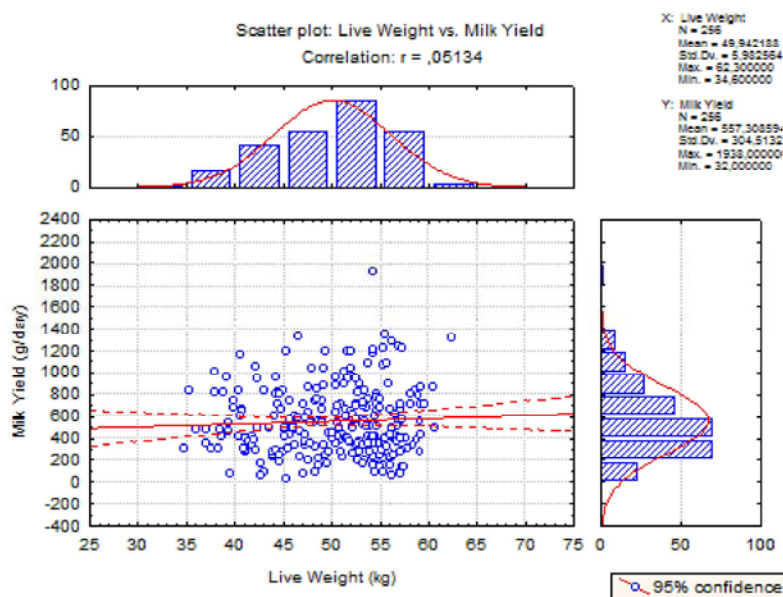


Fig. 3: Scatter plot of live weight and daily milk yield.

level reached in the second week (figure 1) because ewes cannot support milk production needs [5, 6]. However, in the second *postpartum* month, body weight losses continue but in a lesser extent (0.100 kg; $p = 0.946$). Thus, body weight losses were not important due to limited milk production of tested sheep breed in this study [27]. Whereas, ewes with high milk production potential showed body reserves mobilization levels always superior to *Rembi* sheep [27-30]. Body weight recovery has started in the 3rd and 4th lactation months (table 1); which were characterized by the lowest recorded milk production levels (430 ± 161 g day⁻¹ and 304 ± 161 g day⁻¹, respectively). These findings are in agreement with those reported by Lakhsassi and El Fadhi [27] and Flores [28].

At the end of lactation period, *Rembi* ewes showed overall losses of 2.9% of initial LW. This result suggests that feeding level during whole lactation period was near to production needs which is in accordance with many studies indicating that improvement of nutrition level limits body weight losses in lactating ewes [4, 5, 20, 27].

Finally, no statistically significant correlation ($r = 0.05$) was found between daily milk yield and body weight changes during all lactation periods (Figure 3).

In conclusion, lactating *Rembi* sheep showed moderate body weight changes, despite their heavy weight, with low milk production. Hence, further improvement of feeding may help to limit LW losses.

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