

Milk Yield Estimated by the Hormonal Method in the Queue Fine de l'Ouest and Noire de Thibar Ewes

¹R. Sadraoui, ²M. Jaouad, ³B. Rekik and ⁴G. Khaldi

¹Faculte des Sciences de Gafsa, 2012 Gafsa, Tunisie

²Institut des Regions Arides de Medenine, 4119 Medenine, Tunisie

³Ecole Superieure d'Agriculture de Mateur, 7030 Mateur, Tunisie

⁴Institut National Agronomique de Tunisie, 43 Avenue Charles Nicolle,
1082 Tunis Mahrajene, Tunisie

Abstract: Milk production and its impact on lamb growth performance were studied in the Tunisian Noire de Thibar and Queue Fine de l'Ouest meat sheep breeds. A total of twenty ewes with single lambs were used. There were 10 ewes of each breed. Mean age and mean body weight in both of ewe groups were 4.5 years (STD = 1.5 years) and 47.7 kg (STD = 4.9 kg). Ewes were maintained on natural pastures and harvest left over and complemented with vetch oat hay in addition to concentrate during gestation and the suckling period. Milk yield (using the hormonal method) and milk fat content were recorded weekly. The shapes of lactation curves were comparable for NT and QFO ewes and showed two distinct phases although the QFO ewes had their pick at the 2nd week of lactation, 1 week earlier than that of the NT ewes. Mean total milk yields were 152.70 (STD = 38.89) and 164.73 kg (STD = 51.72 kg) for the QFO and NT ewes, respectively. As for milk production, lamb growth was also comparable in both ewe groups. The sex of the lamb seemed not to affect growth performances in both breeds. Mean weights of lambs increased by 200 g on a daily basis during the 1st 40 days of age. This increase was then reduced to only 150 g at later ages. Meanwhile mean weight losses of ewes following parturition were on the average 5.0 (STD = 2.3) and 4.2 kg (STD = 2.9) for the QFO and NT ewes, respectively. The QFO and NT ewes have a good potential for milk production that allow acceptable growth of lambs.

Key words: Milk yield, milk fat, Queue Fine d'Ouest, Noire de Thibar, ewe, meat

INTRODUCTION

Sheep breeding is an important sector in the making of the Tunisian agricultural policy. This sector is vital not only for its contribution to meat production but also for generating jobs and holding rural population in range land. Meanwhile, sheep management remains traditional and is characterised by a low productivity estimated at 12 kg of meat per ewe per year. This low productivity is essentially resulting from limited growth of lambs.

The improvement of meat sheep productivity necessitates the study of milk production by main Tunisian meat sheep breeds. Milk yield of ewes during the suckling period is determinant for post weaning weight gains of lambs which is a prerequisite for an improved ulterior growth. The objectives of this study were to estimate milk yield using the hormonal method in the Noire de Thibar and Queue Fine de l'Ouest meat sheep breeds and to assess the impact of milk yield level on lamb growth performances.

MATERIALS AND METHODS

Animals: A total of twenty ewes with single lambs were used in this study. There were 10 ewes of each of the Noire de Thibar (NT) and Queue Fine de l'Ouest (QFO) meat sheep breeds. Mean age and mean body weight in both of ewe groups were 4.5 years (STD = 1.5 years) and 47.7 kg (STD = 4.9 kg). The lambing period was >20 days in October. Average lamb weights at lambing were 3.80 kg (STD = 0.65 kg) and 3.67 kg (STD = 0.63 kg) in the NT and QFO breeds, respectively.

Feeding: Ewes were maintained on natural pastures and harvest left over (wheat and barely left over) and complemented with 500 g of vetch oat hay in addition to 200 g of concentrate/ewe/day during gestation. During the suckling period, vetch oat hay was distributed at will and the quantity of concentrate per ewe and per day was increased to 500 g. On the other hand, lambs received concentrate in addition to suckled milk.

Measures

Milk production: Milk yield was recorded weekly using the hormonal method (Mc Cance, 1959). The day of the test, lambs were separated from ewes. The udder was then emptied using two oxytocin injections at 2 h interval: firstly, we proceeded by a 5.0 UI of oxytocin jugular injection followed by a hand milking. Researchers within 2 h thereafter administered a 2.5 UI injection and emptied the udder by hand milking. Milk yield obtained at the second udder emptying by hand milking was multiplied by 12 to estimate milk yield produced in 24 h. Weekly milk recording was carried out over the 1st 16 weeks of the suckling period with the first test occurring 10 days following parturition.

Milk fat recording: Milk fat content was recorded every test day, i.e., every week during 4 months. Samples of 20 mL of ewes' milk in addition to 20 mL of distilled water and 2-3 mg of potassium permanganate were prepared to estimate milk fat content using the method of Gerber.

Ewes' weight recording: Ewes were monthly weighed before feeding over the whole experimental period while lambs were weighed at parturition and every 20 days thereafter until weaning. Growth rates of lambs were calculated by 20 days intervals.

Statistical analysis: Effects of the breed and the sex of the lamb on milk production and growth rate were assessed via the GLM procedure by SAS applied to the following linear model:

$$Y_{ijk} = \mu + R_i + S_j + RS_{ij} + e_{ijk}$$

Where:

Y_{ijk} = Milk yield or growth rate

μ = Overall mean

R_i = Effect of the breed ($j = NT$ or QFO)

S_j = Effect of the sex of the lamb

RS_{ij} = Effect of the interaction of breed by the sex of the lamb

e_{ijk} = Random residuals with mean = 0 and a constant variance

RESULTS AND DISCUSSION

Body live weights of ewes: The QFO ewes were slightly heavier than the NT ewes. On the other hand, the evolution of live body weights was similar for both groups of ewes (Fig. 1). Live body weights of ewes of both breeds increased by almost 3 kg during the 4 weeks (1 month) ahead of parturition. This weight increase may be explained by the increase of the uterus. At the

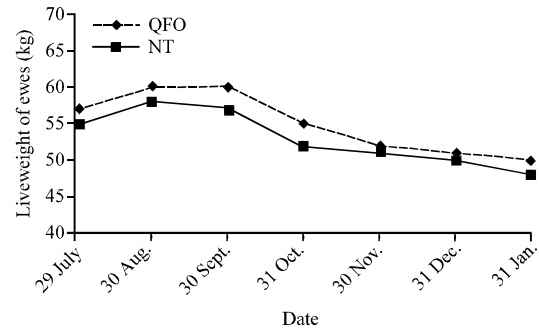


Fig. 1: Evolution of body liveweights of QFO and NT ewes (lambing in October)

beginning of pregnancy, there is a weight gain of ewes caused by the increase in foetal annexes while the weight gain of the embryo remains limited.

The weight of the embryo substantially increases in the second half of pregnancy resulting from the proliferation of small size cells until the 3rd month of parturition. Thereafter, there is an increase in the volume of the embryo cells and consequently around 70% of the foetus development occurs during the last 6 weeks of pregnancy. Results on the evolution of NT and QFO ewes live body weights were reported for other sheep breeds (Forbes, 1970).

Ewes live body weights remained unchanged during the last month of gestation despite of the increase in the uterus weight. Ewes feed requirements are the highest at that stage. Ewes have to use their corporal reserves in order to meet nutritional needs. Ewes lost weights following parturition and during the suckling period. Weight losses were on the average 5.0 (STD = 2.3) and 4.2 kg (STD = 2.9 kg) for the QFO and NT ewes, respectively. These weight losses result from the intense corporal reserve use by ewes for milk synthesis.

Milk yield: Milk yield was not affected ($p > 0.05$) by either the breed or the sex of the lamb. Although, they are heavier at birth, male lambs have suckling aptitudes similar to female lambs (Hugo, 1952; Acharya and Bawa, 1971). The shapes of lactation curves were comparable for NT and QFO ewes and showed two distinct phases although, the QFO ewes had their pick at the 2nd week of lactation, 1 week earlier than that of the NT ewes (Fig. 2). Similar curves were reported by Bonsma (1939), Barnicoat *et al.* (1949), Owen (1957), Wallace (1948) and Peart *et al.* (1979) in other sheep breeds.

Milk yield decreased gradually during the second phase until the end of lactation. Persistency coefficients were 86, 97, 84 and 76% during the 3rd

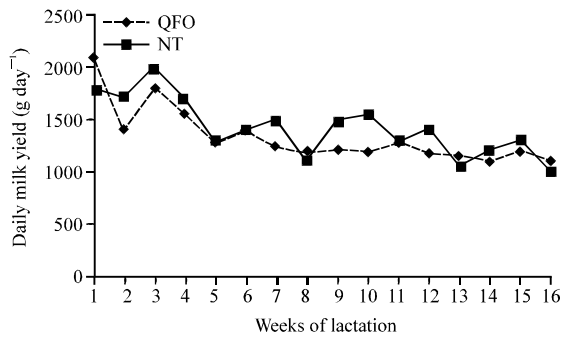


Fig. 2: Evolution of the daily milk yield of QFO and NT ewes

Table 1: Mean (\pm STD) milk yield for different suckling periods in the Noire de Thibar and Queue Fine de l'Ouest ewes (kg)

Period (days)	Queue Fine d'Ouest ewes	Noire de Thibar ewes
0-20	37.11 \pm 9.960	36.72 \pm 11.63
21-40	28.73 \pm 6.070	32.31 \pm 9.280
41-60	32.00 \pm 7.670	23.00 \pm 7.670
0-120	152.70 \pm 38.89	164.73 \pm 51.72

and 4th months of the suckling period for the QFO and NT ewes, respectively. Ricordeau and Denamur found similar results for the Prealpes du Sud, Awassi and Tsigi sheep breeds.

Overall, the QFO and NT ewes showed relatively good aptitudes for milk production because of their capacities to mobilise corporal reserves for milk synthesis as suggested by Khaldi and Molina. Milk quantities by 20 days intervals are shown in Table 1. Mean total yields were 152.70 (STD = 38.89) and 164.73 kg (STD = 51.72 kg) for the QFO and NT ewes, respectively. These performances are important compared to those reported for the Barbarine and the Sicilo-Sarde ewes.

Milk fat content: The evolution of fat percentage in the QFO and NT ewes' milk is shown in Fig. 3. Milk fat content was comparable for ewes of both breeds and its evolution was the opposite of that observed for milk yield (Mavrogeis and Louca, 1980). Fat production was low between the 1st and 6th weeks of lactation (mean = 4.09% STD = 1.32%) and was significantly higher ($p < 0.05$) in the rest of the lactation period (mean = 5.62% STD = 2.03%) in agreement with reports by Veisseyre, Bocquier and Caja for other breeds.

Growth of lambs: Growth curves of QFO and NT lambs are shown in Fig. 4. These curves were comparable for both breeds and seemed linear from birth to 80 days. Lamb growth seemed to slow down between 80 and 100 days of age. As for milk yield production neither the breed nor the sex of the lamb had an effect on growth performances

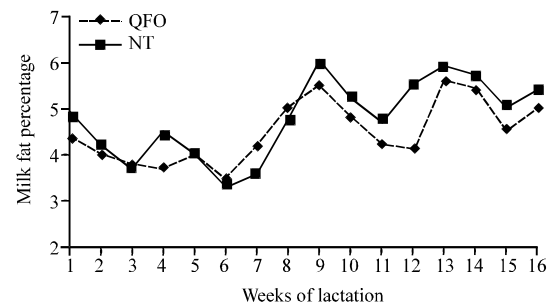


Fig. 3: Evolution of the milk fat percentage of QFO and NT ewes

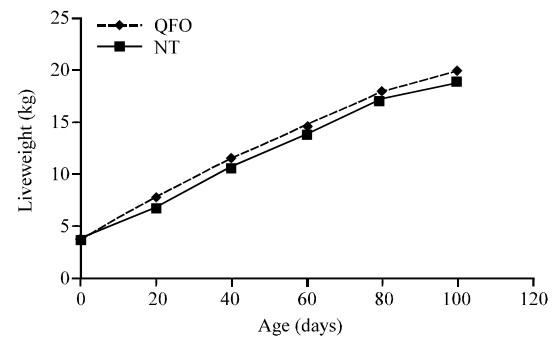


Fig. 4: Evolution of liveweights of QFO and NT lambs

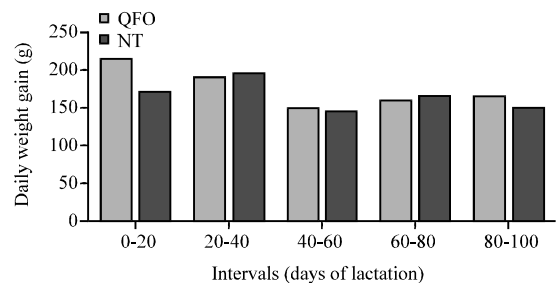


Fig. 5: Body weight gains of QFO and NT lambs

of lambs (Theriez, 1984; Khaldi, 1989). Mean daily body weight gains are shown in Fig. 5. Mean weights of lambs increased by 200 g on a daily basis during the 1st 40 days of age. This increase later ages (between 40 and 100 days). Reduced weight gains may have resulted was then reduced to only 150 g from lowered milk production and at elevated nutritional needs of lambs. These nutritional needs are not fully met by gradually decreasing milk production by ewes which are themselves struggling to meet their needs on deteriorating pasture resources. These results corroborate with those reported for sheep breeds on extensive pasture systems (Adeleye, 1984; London and Weniger, 1996; Yapi-Gnaore *et al.*, 1997).

CONCLUSION

The QFO and NT ewes have a good potential for milk production. Lactation curve shapes were comparable for ewes of both breeds. Pick yields occurred 2 and 3 weeks following parturition for the QFO and NT ewes, respectively. Milk quantities produced by ewes during the suckling period allowed acceptable growth of lambs essentially during the 1st 40 days of the suckling period. Growth of lambs slowed thereafter down between 40 and 100 days of age because of the gradual decrease in milk production by ewes. The sex of the lamb seemed not to affect growth performances in both breeds.

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