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Sheep management in the eastern Moroccan area: Livestock breeders' practices and effect of ewes' supplementation on lamb performances

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Abstract. The study was conducted in the eastern Moroccan area and aimed to analyze and describe sheep feeding practices and reproductive performance in the region, and to study the effect of supplementary feeding under extensive system on lamb performances before weaning (at 80 days of age) and after (until 30 kg live-weight). The first objective was carried out by interviews with farmers and the second objective was carried out through an experiment using two treatments: (i) T1-lambs whose dams grazed and receive supplementation during the late gestation and early lactation periods; (ii) T2-lambs whose dams grazed without supplementation. Results obtained from livestock farmers interviews (objective 1) showed that 75% of livestock holders prepare the fattening lambs for *Eid El Adha*. The fattening period is 3.7 months (varying between 2-5 months) and the fattening diet is characterized by the use of mixture of barley and wheat bran (97.5%) used alone (62.5%) or mixed with other concentrates (35%). The reproductive management is characterized by natural mating, early age at lambing, and late weaning. Results obtained from the experiment (objective 2) showed that supplementary feeding had a positive effect on the growth and fattening performances. The weaning weight (at 80 days) of T1 was higher than T2 (20 *vs* 15 kg, respectively). Comparing between the ewe's supplementary feeding cost and the obtained average daily gain, we conclude that the supplementation is recommended for its economic and environmental benefits. Results of the current study recommended the use of supplementary feeding for ewes during late gestation and early lactation to improve lamb's growth and fattening performances and to maintain pasture condition and avoid overgrazing.

Keywords. Eastern Morocco – Supplementation – Sheep – Fattening – Growth – Livestock breeders' practices.

Conduite des élevages ovins dans la zone du Maroc oriental : Pratiques des éleveurs et effet de la supplémentation des brebis sur les performances des agneaux

Résumé. *Les objectifs de ce travail mené dans la zone du Maroc oriental étaient : 1. Analyser et décrire la conduite alimentaire et de reproduction dans la zone, et 2. Etudier l'effet de la supplémentation des brebis, conduites sur parcours, sur les performances de croissance (de la naissance jusqu'à 80 jours) et d'engraissement (du sevrage au poids de 30 kg) de leurs agneaux. Le premier objectif est atteint en réalisant des enquêtes auprès des éleveurs de la zone et le deuxième en conduisant un essai constitué de 2 traitements: T1: agneaux issus des brebis ayant reçu une supplémentation durant la fin de gestation et début de lactation (pâturage et supplémentation quotidienne) et T2 : agneaux issus des brebis qui n'ont reçu aucune supplémentation (pâturage seul). Les résultats obtenus à travers les entretiens auprès des agriculteurs ont montré que 75% des éleveurs pratiquent l'engraissement pour la fête de Aid El Adha, la durée d'engraissement est de 3,7 mois (2-5 mois), les rations d'engraissement sont caractérisées par l'utilisation du mélange orge-son (97,5%) seul (62,5%) ou mélangé avec d'autres aliments concentrés (35%). La conduite de reproduction est caractérisée par la lutte libre, l'âge précoce des antenaises au premier agnelage et le sevrage tardif. Les résultats obtenus lors de l'essai (objectif 2) ont montré que la supplémentation avait un effet positif sur les performances de croissance et d'engraissement. Le poids au sevrage (à 80 jours) de T1 a été supérieur à T2 (20* vs *15 kg). En comparant le coût de supplémentation des brebis, durant la fin de gestation et début de lactation, et le GMQ obtenu on conclut que la supplémentation est rentable du point de vue économique et environnemental. Ces résultats recommandent la supplémentation des brebis en fin de gestation et début de lactation pour améliorer les performances de croissance et d'engraissement des agneaux.*

Mots-clés. *Maroc oriental – Supplémentation – Ovin – Engraissement – Croissance – Pratiques des éleveurs.*

I – Introduction

Sheep farming plays an important socio-economical role in Morocco. It provides about 40% of the red meat production. It has expanded to all the country and is considered as one of the main sources of income to farmers. It allows the exploitation of pasture and marginal zones. The eastern Moroccan region is mainly dominated by extensive sheep production system. It contains vast rangelands around 5 million hectares, and about 2 million sheep heads (USAID, 2006). Rangelands and livestock ecosystem has an important environmental and socioeconomically role as a source of income for rural populations in this region. However, sheep production in the region faces many constraints such as rainfall irregularity, scarcity and shortage of feed resources, and also inadequate health management. This inappropriate management is considered an important obstacle to improve the productivity performance of sheep and the farmer's income. The objective of this work is to analyze and describe sheep feeding practices and reproductive performance in the region and to study the effect of supplementary feeding on the lambs' growth and performances.

II – Materials and methods

This study was conducted in the eastern Moroccan area. It consisted of two parts: the first one is related to the description and analysis of sheep feeding practices and reproductive performance, and the second one investigated the effect of supplementary feeding on lambs' growth and fattening performances. To achieve the first objective, forty interviews were done with farmers who are selected based on their farm activity and level of collaboration. The questionnaire covered aspects related to farm structure (herd and agricultural area), and sheep reproductive performance and feeding practices. For the second objective, 92 ewes were used and divided into 2 groups, grazing with (T1) or without (T2) concentrate supplement (UFL: 0.9, CP: 14%). Seventy-two ewes were employed in T1 and supplemented during the late pregnancy (0.4 kg/ewe/day) and early lactation (0.5 kg/ewe/day) periods, while other twenty ewes were assigned as a control group (T2) without supplement. Before starting the experiment, ewes and then lambs (before fattening) were treated against internal parasites and vaccinated against enterotoxemia.

During the early lactation phase, the grazing forage resources were scarce and ewes of both treatments were supplemented with alfalfa hay (UFL: 0.6, CP: 17%, and 0.5 kg/ewe/day) to cover the shortage of forage in the pasture. After birth, lambs were weighed directly at birth, and at 10, 30 and 80 days (weaning time). In addition, the average daily gain was calculated from 10 to 30 days (ADG 10-30), and from 30 to 80 days (ADG 30-80). Milk was the only feed for lambs during the first six weeks after birth and alfalfa hay was offered afterwards and continued till weaning. After weaning, lambs were employed in a fattening trail for 42-day period or 30 kg of live-weight. All lambs were weighed at 21 days interval and receiving a diet containing alfalfa hay and a starter compound feed (DM: 88%, UFV: 0.9, CP: 16%) during 25 days and a finishing compound feed (DM: 88%, UFV: 0.9, CP: 14%) during 17 days. The diet was administrated twice daily. Free clean water was available all time.

The effect of supplementary feeding was tested through the difference between the average gain for T1 and those for T2 lambs. The cost of kg live-weight gain resulting from the supplementary feeding effect is calculated as the cost of supplementation (Moroccan Dirham: MAD; 1 USD = 8.4 MAD) divided by the average gain. The effect of supplementary feeding for ewes on lambs' growth performance (weaning weight or initial fattening weight is used as

covariable) was analysed by means of ANOVA using the PROC GLM procedure of the SAS statistical package (version 8.01).

III – Results and discussion

1. Livestock farmers' practices

Average parameters describing the sheep farmers interviewed are summarized in Table 1. Sheep production is the main activity of farmers. The fattening lamb was designed by farmers to be the main source of income. Farmers are using the agriculture and livestock together to meet their needs for livelihood level.

The average size of useful arable area (UAA) is 57 ha. The results analysis showed a positive correlation (R^2 = 0.7) between the UAA and the number of sheep and fattening lambs. This correlation is explained by the dependence of sheep to feedstuffs produced in the farm.

The number of sheep per farm ranged from 100 to over 600 with an average of 358 heads. The difference of sheep number among farmers gave an idea to different managements, in terms of fattening and feeding and reproductive management. The number of fattening lambs per year is 160 head as average. Farmers have reported that the number of fattening animals is variable and depending mainly on the environmental conditions, such as raining, available feed resources, etc.

Table 1. Livestock breeders characteristics in the eastern Moroccan region (n=40)

Parameters	Average
Sheep number/farm	358
Useful arable area (ha)/farm	57
Fattened lambs (number/farm)	160
Sex ratio	25
Fertility rate (%)	86.5
Level of prolificacy (number of lambs born/ewes lambed)	1.01
Age at 1st lambing (months)	13
Concentrates-feed/lamb at beginning of fattening (kg/head/day)	0.6
Concentrates-feed/lamb at the end of fattening (kg/head/day)	1.5

Fattening concerns mainly male lambs (80% of fattened animals). The inquisitions reported that the young male sheep within 7-8 months are the most employed for fattening (77.5%), while those having 3-6 months and those more than one year are represent almost 15 and 7.5% of fattening trails, respectively. Most farmers prepared the fattening lambs to be ready for *Eid El Adha.* The fattening period varies from 2 to 5 months with an average of 3.7 months. It depends on drought and dry season and the cost of feedstuffs.

Feeding the fattening lambs is based on grazing and concentrate supplementation. The supplement is mainly consisted of mixture from barley and wheat bran (97.5 %) and used alone (62.5%) or mixed with others concentrates (35%) (maize, dried beet pulp, or compound feed). The fattening diet is administered twice daily. The amount of concentrate distributed at the beginning and at the end of fattening was 0.6 kg/lamb/day and 1.5 kg/lamb/day, respectively.

The energetic supply from concentrate at the beginning of fattening is about 0.5 UFV/kg DM of the supplement. This value is lower than requirements for fattening lambs and leading, therefore, to decrease in lamb growth rate. In contrast, at the end of fattening, the amount used

is much higher than lamb requirements (Jarrige, 1988). Live-weight at the beginning of fattening averages 30 Kg, and at the end of fattening varies from 45 to more than 50 kg.

Reproductive performance: There was an important lack of information on reproduction data in farms. No management mating is implemented. All interviewed farmers practice natural mating, in which males remain permanently with females all year. This leads to a random distribution of lambing and also early mating for young females at approximately 7 to 8 months of age. The average age at first lambing is 13 months. However, most of lambings occur during November and December. The sex ratio adopted is on average 25 ewes per ram with a variation of 15 to 30. The average of fertility rate was 86.5% and level of prolificacy (number of lambs born/ewe lambed) was 1.01.

2. Effect of ewes' supplementation on the growth and fattening performances of lambs

Growth and lamb performances are given in Table 2. Birth weight of lambs born from ewe given supplementation was significantly (P<0.05) higher than those born from not supplemented ewes (4.0 *vs* 3.4 kg for T1 and T2, respectively). This superiority of T1-lambs birth weight is due to the positive effect of ewe's supplementary feeding in late pregnancy (Robinson, 1985).

During the growing period (birth to weaning), lambs in T1 had greater (P <0.05) BW (at 0, 10, and 30 days, and at weaning) and higher ADG (10-30, and 30-weaning) than lambs in T2. At weaning, the difference in live weight between lambs in T1 than those in T2 was almost 5 kg. The marked increase in average gain is attributable to the positive effect of ewes' supplementation during late pregnancy and early lactation that resulted in more milk yield being consumed by the offspring (Muñoz *et al.*, 2008; Robinson, 1985).

Table 2. Effect of ewes' supplementation on growth and fattening performances of their lambs

	Treatment		Significance
	T1-lambs(n=72)	T2-lambs (n=20)	
Growth performances			
Birth weight (kg)	4.0[a]	3.4[b]	<0.0001
Weight at 10 days (kg)	5.9[a]	4.5[b]	<0.0001
Weight at 30 days (kg)	9.7[a]	7.5[b]	<0.0001
Weaning weight (kg)	20.0[a]	15.0[b]	<0.0001
ADG10-30 (g/day)†	191[a]	153[b]	<0.0001
ADG30-80 (g/day) †	207[a]	151[b]	<0.0001
Fattening performances			
Weight at 21 days post-weaning (kg)	24.9[a]	19.3[b]	0.0457
Weight at 42 days post-weaning (kg)	30.7	25.0	0.6858
Fattening ADG0-21 (g/day) †	233[a]	200[b]	0.0011
Fattening ADG21-42 (g/day) †	277[a]	271[b]	0.0457

†ADG: Average daily gain. [a, b] Means with different superscripts are significantly different (P< 0.05).

During the finishing phase (fattening, 42 days), the objective was to produce lambs with live weight of 30Kg. The initial weight at the beginning of fattening was 20.0 and 15.0 kg for lambs in T1 and T2 groups respectively. This initial weight was used as co-variable in the statistical analysis. After 42 days post weaning, the live-weight was 30.7 and 25 kg for lambs in T1 and T2, respectively. The ewes' supplementation didn't have effect on the live-weight at 42 days

(P=0.6858), in contrast, it had a significant effect on live-weight at 21 days post-weaning and ADG21-42 (P=0.0457).

At the end of fattening, lambs were sold at price of 30 MAD/kg LW. In addition, the kg of LW gained by supplementation was 23.6 MAD (Table 3). Considering this price, the supplementation of ewes during late pregnancy and early lactation presented an economical interest.

Table 3. Production cost of kg lamb live-weight generated by ewes' supplementation

	ADG† of lambs (g)	ADG generated by supplementation (g)	Supplementation cost†† (MAD/day)	Production cost of 1 kg of LW generated by supplementation (MAD/Kg LW)
T1-lambs	200	55	1.3	23.6
T2-lambs	145			

†ADG from birth to weaning
††Concentrate price: 3 MAD/kg, selling price of lamb: 30 MAD/1kg LW, MAD: Moroccan dirham, 1 USD=8.4 MAD

IV – Conclusions

Fattening lamb is considered as the main activity for livestock farmers. In addition, animal nutrition is based on grazing and the supplementary feeding is mainly used for growing and fattening lambs. The lack of organized management negatively affects the reproductive performance in the area.

The ewes' supplementation had a positive effect on the offspring's performance mainly during the pre-weaning phase. Supplementation may allow ewes to recover the weight loss during gestation and lactation, and meet their nutrients requirements. Moreover, the late pregnancy and lactation periods coincide with the forage shortage on pastures. Therefore, ewes' supplementation may maintain the sustainable management of pastoral resources and avoid overgrazing and desertification.

References

Jarrige R., 1988. *Alimentation des bovins, ovins et caprins*. INRA, Paris.

Muñoz C., Carson A.F., McCoy M.A., Dawson L.E.R., O'Connell N.E. and Gordon A.W., 2008. Nutritional status of adult ewes during early and mid-pregnancy. 1. Effects of plane of nutrition on ewe reproduction and offspring performance to weaning. In: *Animal*, 2(1), p. 52-63.

Robinson J.J., 1985. Nutritional requirements of the pregnant and lactating ewe. In: Land R.B. and Robinson D.W. (eds), *Genetics of reproduction in sheep*. Butterworth, London. p. 361-370.

SAS, 2000. *SAS Version 8.01*. SAS, NC, USA.

USAID, 2006. *Promotion des viandes ovines à l'oriental du Maroc*. US Agency for International Development, Maroc.