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# The effect of ewes synchronization on growth and fattening performances of synthetic ram-lambs

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**SUMMARY** – The purpose of this study was to evaluate lambing performances of synchronized and natural mated ewes together with the growth and fattening performances of synthetic male lambs, born out of season in the district of Adana in the East Mediterranean Region of Turkey. Growth performances of lambs were observed from birth to weaning time. They were weaned at 2 months of age. After a week, the feedlot period was started. Ten synchronized ram lambs and 10 non-synchronized ram lambs at Cukurova University Research Farm Unit were chosen for evaluation of fattening performance and carcass traits according to birth types and live weights (25 kg) and assigned randomly to two groups. They were group fed. All lambs had *ad libitum* access to feed and water during the trial. Each morning, lambs were supplied with concentrates and alfalfa hay. After 40 days the feedlot period was completed. Average daily feed intake and daily weight gain for individual lambs were calculated using weekly measurements of body weight and weekly feed intake records. Six lambs in each group were slaughtered. Hot carcass weights, head weights, foot, skin and some visceral organs, fat depots and some body measurements were recorded and dressing percentage was calculated. According to the obtained data, twinning rate was increased almost 37% by hormone treatment. The mortality rate of hormone-treated ewes was found to be higher than non-treated ewes (40%), and lambing rate was higher in the hormone treated group (23%). Daily weight gain and feed efficiency were calculated as 340.1 g and 3.7 kg for hormone treated and 347.3 g and 3.22 kg for non-treated lambs. Dressing percentages were 52% and 54% in hormone treated and non-treated lambs, respectively. The result of this study showed that the crossbred of early ram-lambs can be recommended to produce lamb meat out of season. It can be said that hormone treatment has positive effects on reproduction traits of ewes.

**Keywords:** Synchronization, growth, fattening, lambing performances, carcass yield.

**RESUME** – "Effet de la synchronisation des brebis sur les performances de croissance et d'engraissement d'agneaux mâles synthétiques". Le propos de cette étude était d'évaluer les performances d'agnelage de brebis synchronisées et accouplées en monte naturelle, ainsi que les performances de croissance et d'engraissement d'agneaux mâles synthétiques, nés à contre-saison dans le district d'Adana en Méditerranée Orientale Turquie. Les performances de croissance des agneaux ont été observées de la naissance au sevrage, effectué à l'âge de deux mois. Après une semaine, commençait la période en lot d'engraissement. Dix agneaux mâles synchronisés et 10 agneaux mâles non synchronisés, à la Ferme de Recherches de l'Université de Çukurova, ont été choisis pour évaluer les performances d'engraissement et les caractéristiques de la carcasse selon le type de naissance et le poids vif (25 kg) et ont été distribués au hasard dans deux groupes. Ils ont été alimentés en groupe. Tous les agneaux avaient un accès à volonté à l'aliment et l'eau pendant l'essai. Tous les matins, les agneaux recevaient du concentré et du foin de luzerne. Après 40 jours, la période d'engraissement terminait. L'ingestion moyenne quotidienne et le gain moyen quotidien ont été calculés individuellement pour les agneaux, en utilisant les mesures hebdomadaires de poids corporel et d'ingestion alimentaire. Six agneaux de chaque groupe ont été abattus. On a enregistré le poids de la carcasse chaude, poids de la tête, des pieds, de la peau et de certains organes viscéraux, du dépôt de gras, ainsi que certaines mesures corporelles, et ensuite on a calculé le pourcentage de rendement en carcasse. Selon les données obtenues, le taux d'agnelage double augmentait de presque 37% par traitement hormonal. Le taux de mortalité des brebis traitées aux hormones était supérieur à celui des brebis non traitées (40%), et le taux d'agnelage était supérieur chez le groupe traité aux hormones (23%). Le GMQ et le taux de conversion alimentaire furent de 340,1 g et 3,7 kg pour les agneaux traités aux hormones et de 347,3 g et 3,22 kg pour les agneaux non traités. Le rendement en carcasse était de 52% et 54% chez les agneaux traités et non traités, respectivement. Le résultat de cette étude montre que les agneaux mâles croisés précoces peuvent être recommandés pour produire de la viande d'agneau à contre-saison. On peut dire que le traitement aux hormones présente des effets positifs sur les caractères de reproduction des brebis.

**Mots-clés :** Synchronisation, croissance, engraissement, performances d'agnelage, rendement de la carcasse.

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## Introduction

Growth and development is the base for meat production whereas distribution of carcass tissues is

significant in determining carcass quality. Lean, and to a lesser extent fat, are the major edible tissues of the carcasses. In countries where meat is sold in cuts, lean content of each cut is an important factor for determining the value of the cut. Amount and site of fat in the carcass influences its quality (Mahgoub and Lu, 1998). Lambs are slaughtered just after weaning in majority of Mediterranean countries. Sometimes they are slaughtered after short feedlot periods in extensive system in Turkey. But this period comprise the first 6 months of the animals life, and fat cover of this yearling lambs' carcasses is too high. Distribution of carcass tissues has been well studied in sheep (Mahgoub and Lu, 1998; Macit, 2002; Güney, 1990, Bicer *et al.*, 1995).

The objective of this study was to evaluate the effect of oestrus synchronization treatment on reproductive performance of synthetic ewes and fattening and carcass performances of synthetic male lambs.

## Materials and methods

This experiment was carried out at the Research Farm at the Agriculture Faculty of Cukurova University, situated in the subtropical part of Anatolia. Animal material of this experiment has been obtained by reciprocal crossing of Ile-de-France, Chios and Awassi. All dams were divided into two groups: the first group was synchronized by Chrono-gest methods and was mated at the beginning of April 2003 (Anonymous, 1988) while the second group was mated by natural methods in the same time. Lambs were born at the beginning of October. All animals were group-fed on concentrate (12% crude protein and 2300 kcal ME/kg), corn silage, alfalfa hay and oats. Number of mated ewes, number of lambing ewes and total lamb number were collected. Growth performances of all born lambs were observed from birth to weaning time by weighing them once a week. Lambs were weaned at 2 months of age. After a week, the fattening period was started. Ten synchronized ram lambs and 10 non-synchronized male lambs were chosen, for the evaluation of fattening performance and carcass traits, according to birth types (only single birth) and live weight (25 kg). They were fed on group base. All lambs had *ad libitum* access to feed and water during the trial. Each morning, lambs were supplied with concentrates and alfalfa hay. The composition of the experimental concentrate feed was: 88% dry matter, 2400 kcal ME/kg of DM, 18% crude protein, 8% ash, 12% crude cellulose. Average daily feed intake and individual daily weight gain were calculated using weekly measurements of body weight and weekly feed intake records. Average feed conversion for groups was calculated as average daily feed intake/average daily weight gain. Six lambs in each group were slaughtered at end of the 40 days of fattening trial. They were fasted for 24 h before slaughter. Hot carcass weights, weights of head, foot, skin, some visceral organs and fat depots were recorded and dressing percentage was calculated.

After 24 h of chilling at 4°C, cold carcass weights were recorded and the following measurements were taken: carcass length, chest depth, leg length, width of buttock, circumference of thorax. Carcasses were sawed into two halves and both sides were weighted. Fat depth measurements were taken from the left side over the 12<sup>th</sup>-13<sup>rd</sup> rib and eye muscle area, using a ruler. In addition, depth and length of eye muscle (*longissimus dorsi*) area was measured. The left sides were stored for dissection in 4°C. Left sides were dissected into intermuscular and subcutaneous fat, muscle and bone as described by Colomer-Rocher *et al.* (1987).

All data were analysed with a t-test methods using SPSS package computer programme (SPSS, 1993). Significant differences between means were based on Duncan's multiple range test (Duncan, 1955).

## Results and discussion

The effects of synchronization on reproduction traits are given in Table 1.

According to the obtained data, twinning rate (the ratio: number of ewes with twin or triplet parturition/total parturition) was increased almost 37% by hormone treatment. Even neonatal mortality rate in hormone treated ewes was found higher than in non-treated ewes (40%), litter size was quite higher in hormone treated group (30%). Özcan *et al.* (1994) conducted a research activity on the same animal material. They reported that the flock synchronized by Chrono-gest method had 49.5

lambing rate; 45% twins, 9% triplets and 0.4% pentaplets when the non-treated flock has only 21.6% twins, respectively. Our findings are higher than data obtained by Özcan *et al.* (1994).

Table 1. Synchronization trial: Reproductive performances of treated and non-treated ewes

Traits	Hormone treated	Non-treated
Infertile ewes (head)	6	7
Ewes served (head)	49	41
Ewes lambed (head)	43	34
Singles (head)	7	24
Twins (head)	50	26
Triplets (head)	33	9
Lambs born	90	59
Infertility rate (%)	12	17
Neonatal mortality rate (%)	7	5
Fertility	1.14	1.20
Fecundity	1.97	1.43
Litter size	2.25	1.73

The information of the fattening performances of both groups are given in Table 2.

Table 2. Fattening trial: Lambs live weight gain and food consumption

Traits	Lambs from hormone treated ewes	Lambs from non-treated ewes	P
	X±Sx	X±Sx	
Number of animals	10	10	-
Initial weight (kg)	25.07 ± 1.38	25.02 ± 1.50	-
Final weight (kg)	38.86 ± 1.24	40.01 ± 1.57	*
Daily weight gain (g)	340.12 ± 09.23	347.37 ± 11.86	*
Period (days)	40	40	-
Daily feed consumed (kg)	1.26	1.21	-
Feed efficiency (kg/kg)	3.70	3.22	*

\*P<0.05; -: NS.

Differences between fattening performances of lambs from treated and non-treated ewes were found significant. At the end of the fattening trial (40th days), lambs from non-treated ewes gained 4% more live weight than those from treated ewes. Daily weight gain and feed efficiency were calculated and were on average equal to 340.12 g/d and 3.7 kg of DM/kg weight gain for hormone treated, and 347.3 g/d and 3.22 kg of DM/kg weight gain for non-treated group, respectively. Average values of carcasses of both groups were given in Table 3. Lamb carcasses from non-treated ewes were 1.2 kg heavier than that of the hormone treated lambs, resulting in 8% highest hot and cold dressing percentage. There were no significant differences between skin, blood, visceral organs, proportion of omental, carcass fat depth over 12<sup>th</sup> rib and eye-muscle of two groups. Similar results were reported by Bicer *et al.* (1995). Carcass joints, proportion of neck, ribs, long-leg and flank decreased in non-treated lambs while slaughter weight did not differ between the two groups. According to Bicer *et al.* (1995), dressing percentage of native Awassi ram lambs was 48.6 for intact lambs. Güney (1990) reported that dressing percentage of Ile de France x Awassi (F1), Rambouillet x Awassi (F1) and Awassi were 50.3%, 46.7% and 46.6%, respectively. Our findings were higher than that of Güney

(1990) and Bicer *et al.* (1995). Data showed that shoulder, flank, long-leg, neck and ribs made up 15%, 12%, 32%, 7%, and 27% of left halves weights in lambs from hormone treated group. In lambs from non-treated group these values were 13%, 12%, 29%, 6% and 25%, respectively.

Table 3. Weights of carcass and same parts of the body of the dissected ram lambs

Traits	Lambs from hormone treated ewes (X±Sx)	Lambs from non-treated ewes (X±Sx)	P
Number of animals	10	10	
Slaughter weight (kg)	38.86 ± 1.24	40.01±1.57	*
Hot carcass weight (kg)	20.01±1.01	21.97±0.34	*
Cold carcass weight (kg)	19.83±0.24	20.17±0.38	*
Dressing percentage (%)	52	54	-
Cold dressing percentage (%)	51	52	-
Skin weight (kg)	4.12±0.11	4.37±0.21	-
Blood (kg)	1.33±0.04	1.30±0.12	-
Omental fat (kg)	0.69±0.08	0.76±0.09	-
Testicles (g)	60±0.03	62±0.06	-
Right side (kg)	10.54±0.13	10.77±0.17	-
Left side (kg)	9.29±0.23	9.42±0.30	-
Kidneys (g)	11±0.03	13±0.02	-
Head (kg)	1.99±0.20	2.07±0.07	-
Feet (kg)	0.97±0.05	1.00±0.07	-
Lungs and liver (kg)	1.86±0.12	1.87±0.12	-
Spleen (g)	7±0.02	8±0.01	-
Hearth (g)	11±0.01	12±0.01	-
Gut (full) (kg)	5.65±0.11	5.62±0.43	-
Gut (empty) (kg)	1.45±0.12	1.45±0.06	-
Diaphragm (g)	13±0.09	8±0.03	-
Carcass fat depth (over 12 <sup>th</sup> rib, cm)	0.79±0.12	0.80±0.12	-
Eye muscle depth (cm)	3.17±0.31	3.20±0.23	-
Eye muscle width (cm)	6.40±0.34	6.27±0.36	-
Carcass fat depth (over eye muscle, cm)	1.30±0.20	1.37±0.27	-
Chest width (cm)	25.30±0.25	25.50±0.57	-
Body length (cm)	103.00±0.40	104.50±0.86	-
Leg length (cm)	27.25±0.94	28.75±4.81	-
Width of buttock (cm)	19.75±0.75	20.00±0.57	-
Circumference of thorax (cm)	79.50±0.29	81.25±1.03	-
Thoracic depth (cm)	25.25±0.25	25.50±0.28	-
Shoulder (kg)	1.43 ±0.25	1.45±0.35	-
Flank (kg)	1.40±0.06	1.44±0.09	-
Long leg (kg)	2.99±0.78	3.07±0.75	-
Neck (kg)	0.68±0.07	0.70±0.05	-
Ribs (kg)	2.58±0.22	2.62±0.12	-
Tail (kg)	0.13±0.01	0.15±0.03	-

\*P<0.05; -: NS.

Meat, bone and fat contents in cold carcass parts are shown in Fig. 1. There were no significant

hormone treatment effects on the proportion of muscle, bone subcutaneous, intermuscular fat and kidney-knob channel fat contents ( $P>0.10$ ). Approximately 22% bone, 49% muscle, 25% fat (IMF+SCF+KKCF) in hormone treated group, and 19% bone, 42% muscle, 36% fat (IMF+SCF+KKCF) proportion in non-treated group were calculated, respectively.

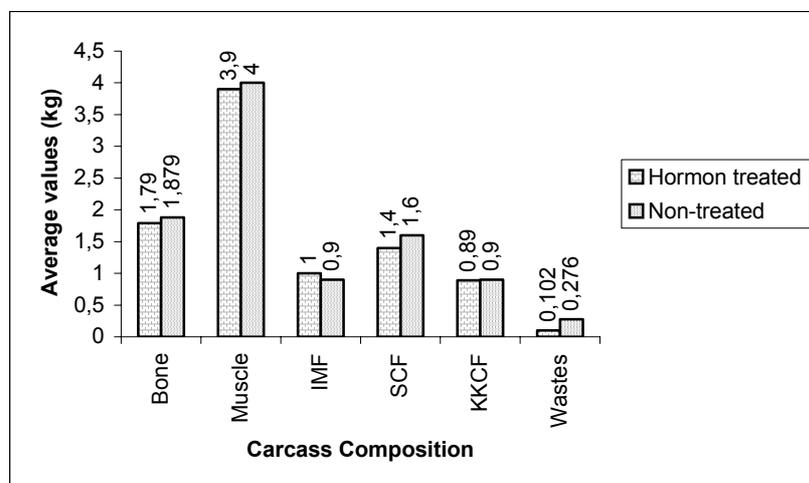


Fig. 1. Carcass characteristics of the cold carcass of ram lambs (IMF: intermuscular fat, SCF: subcutaneous fat, KKCF: kidney knob-channel fat).

## Conclusions

The results of this study showed that hormone treatment has positive effects on reproductive traits of ewes. It is evident that total lamb number could be increased almost 60% by hormonal treatment. When ewes were synchronized by Chrono-gest method, they had higher litter size compared to the non-treated group. In the fattening trial, lambs from hormone-treated ewes had similar performances compared to lambs from non-treated ewes and there were no significant differences between carcass compositions of both groups.

The result of this study showed that the crossbred of early ram-lambs can be recommended for the out-of-season production of lamb meat.

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