

قسم : الانتاج الحيوانى - كلية الزراعة - جامعة أسيوط .  
رئيس القسم : أ . د . / عبد الله الجمال .

التطور التناسلى فى اناث الحملان الاوسيمى والصعيدى  
المغذاه على مستويين من التغذية

فيصل الحمصى ، جلال عبد الحافظ

استخدم فى هذه التجربة ٤٨ من اناث الحملان ( ٢٥ اوسيمى ، ٢٣ صعيدى )  
المولوده خلال شهر اكتوبر ١٩٧٩ وفى مايو ١٩٨٠ قسمت حيوانات كل نوع عشوائيا  
على اساس وزن الجسم الى مجموعتين فذيت احدها على مستوى التغذية العالى  
والأخرى على المستوى المنخفض . وقد حسب مستوى الطاقة المأكول على أساس  
معدل الزيادة اليومية المتوقعة فى حد ود ١٦٠ ، ٨٠ جم للمجموعة المنخفضة على  
الترتيب ويمكن تلخيص النتائج التى تم الحصول عليها فى الآتى :-

- ١- كان متوسط العمر عند البلوغ الجنسى فى اناث الحملان الاوسيمى والصعيدى هو  
٣٥٦ر١ ، ٣٥٨ر٥ يوما على الترتيب .
- ٢- اناث الحملان المغذاه على المستوى العالى اظهرت الشياح الاول فى عمر مبكر  
بمقدار ١٩٣ر٣ يوما عن تلك المغذاه على المستوى المنخفض .
- ٣- كان متوسط الوزن عند أول شياح فى اناث الحملان الاوسيمى والصعيدى هو  
٣٤٢ر٣ ، ٣٤٧ر٣ كجم على الترتيب .
- ٤- حدث الحمل الأول فى اناث الحملان الصعيدى بعد ١ر٢ تلقيحة فى المتوسط  
بينما حدث الحمل فى اناث الحملان الاوسيمى بعد ١ر٣٦ تلقيحة .
- ٥- فى اناث الحملان المغذاه على المستوى العالى حدث الحمل بعد ١ر٤ تلقيحة  
بينما حدث بعد ١ر١٨ تلقيحة فى الأناث المغذاه على المستوى المنخفض .
- ٦- كانت اناث الحملان المغذاه على المستوى العالى اعلى فى معظم مكونات الدم  
التي قدرت فيما عدا انزيم الالكالين فوسفاتيز الذى كان أعلى بدرجة مؤكسده  
فى المجموعة المغذاه على المستوى المنخفض .

REPRODUCTIVE PERFORMANCE OF OSSIMI AND SAIDI SHEEP UNDER TWO  
PRE PUBERTAL PLANES OF NUTRITION  
(WITH 3 TABLES)

BY

F.F. EL-HOMOSI and G.A. ABD EL-HAFIZ

(Received at 11/3/1981)

SUMMARY

Fourty eight ewe lambs (25 Ossimi and 23 Saidi) were used in this experiment. Animals were born between October and November, 1979. On May 1980, animals from each breed were randomly divided on a live weight basis into high (H) and low (L) nutrition groups. The starch value (S.V.) of rations given to groups H & L was calculated assuming average expected daily gain of 160 & 80 gm, respectively. Results obtained could be summarized in the following.

- 1- The average age at puberty of Ossimi and Saidi ewe lambs was 356.1 and 358.5 days, respectively.
- 2- Ewe lambs fed high plane of nutrition had exhibited oestrus 19.3 days earlier than those received low plane one. Saidi ewe lambs was 34.23 and 34.7 Kg, respectively.
- 3- Conception in the Saidi ewe lambs took place after 1.2 services, while in Ossimi ones it occurred after 1.36 services.
- 4- Conception in animals fed high level of energy took place after 1.4 services which was whigher than that of those receiving the low level of energy (1.18 services).
- 5- Ewe lambs fed high energy level had the highest averages of different blood constituents except alkaline phosphatase which was significantly higher in the group fed the low plane of nutrition.

INTRODUCTION

Puberty in farm animals is influenced by hereditary, nutritional and environmental factors. HAFEZ (1951) suggested that manifestation of the first oestrus requires certain thresholds of live weight in the same way as hormonal thresholds are required.

The age at which the ewe can first be mated is of considerable practical importance both from the view-point of increasing the life time performance of the ewe. Also, there is a probable relationship between the early of sexual activity in the ewe lamb and a generally higher level of reproductive efficiency in the adult ewe (DYRMUNDSSON, 1973).

In Egypt, the breeding season of sheep is in late spring and the lambing season is autumn. Therefore, the age of the ewe lamb is about 18 months at first mating. The present experiment was undertaken to study the effect of level of nutrition on the manifestation of the first oestrus, and other reproductive criteria in two breeds of Egyptian sheep (Ossimi and Saidi).

MATERIALS AND METHODS

The present study was carried out in the Animal Production Experimental Farm, Faculty of Agriculture, Assiut University, Assiut, Egypt. Twenty five Ossimi and 23 Saidi ewe lambs were used in this experiment. Animals were born between October and November, 1979 and were weaned at the age of 4 months.

On May 1980, animals from each breed were randomly divided into two groups high and low (H & L) having similar average body weight. In a previcous study, it was observed that improving the nutritional status of lambs resulted in higher body gain as much as 186 to 224 gm daily gain was recorded (EL-HOMMOSI, 1981). Therefore, the present experiment group H was fed daily amounts of S.V. and digestible protein (D.P.) to meet the expected daily gain of 160 gm. Group L, however, was offered daily amounts of S.V. and D.P. to satisfy the moderate daily gain of 80 gm.

The following formula of GARRETT ET AL. (1959) was used in calculating the TDN requirements for groups H and L.

TDN = 0.029 w <sup>3</sup>/<sub>4</sub> (1 + 5.1 gain Kg)

where w - body weight in Kg. The S.V. was obtained by multiplying TDN by 0.95 (ABOU-RAYA, 1967).

Lambs were group fed on a concentrate mixture consisting of decorticated cottonseed meal (25%), rice bran (23%), wheat bran (14%), corn (35%), calcium carbonate (2%) and commercial salt (1%). The calculated starch value (S.V.) and digestible protein (D.P.) values were about 70% and 14%, respectively.

A commercial mixture of vitamins and trace elements (Pfizer\*) was added to the ration at the rate of 2 Kg per ton. Berseem hay, 500 gm/head was given daily as the sole roughage during the entire period of the experiment. Fresh water was constantly available. Amounts of S.V. offered were adjusted once every two weeks according to changes in the average live body weight of each group. Live weights were recorded every other week before feeding and drinking.

During the period from 15<sup>th</sup> of May 1980 until the end of February 1981 the ewe lambs were checked daily for oestrus using an aproned ram in each group and confirmed by the examination of the cervical mucus for the presence of large sized arborization (OSMAN and BAKSAI, 1970) between 9 a.m. and 1 p.m. Ewe lambs found to be in oestrus were handmated and returned to their respective feeding groups. All heat periods were recorded until pregnancy was established. Ewe lamb unreturned to heat after 60 days from mating were considered pregnant.

Blood samples were collected in the morning from the jugular vein, before offering feed or water. Blood samples from each animal were taken in a two clean dry test tubes. The 1<sup>st</sup> blood sample was allowed to clot at room temperature and the separated serum was centrifuged to obtain clear serum. The 2<sup>nd</sup> sample was mixed with an anticoagulant (heparin). The sampling dates were 15/9, 30/9 and 15/10/1980.

The red blood cells (RBCs) counts and haemoglobin (Hb) values were estimated using the heparinized blood samples. Total serum proteins were determined using the procedure of MACFATE (1972). Serum glucose was determined by the method of KESTON (1956). Serum calcium was determined following the procedure of BAGINSKI ET AL., (1973). Serum inorganic phosphorus was determined by the method of POWER (1953). The alkaline phosphatase was estimated by the method of BELFIELD and GOLDBERG (1971).

The data were analysed statistically according to the methods of SNEDECOR and COCHRAN (1967).

## RESULTS

Results are presented in Tables 1, 2 and 3.

## DISCUSSION

### Age and live weight at first Oestrus:

Average ages and live weights at 1<sup>st</sup> oestrus for the various groups are shown in Table (1). Average age at 1<sup>st</sup> oestrus for the Ossimi and the Saidi ewe lambs was 356.1 and 358.5 days, respectively. Present results indicated that there was no significant difference in the age at first oestrus between the Ossimi and the Saidi sheep. Age of the Ossimi ewe lambs at puberty (356.1 days) was nearly identical to that reported by HAFEZ (1953) who found that the average age at puberty was 358.5 for another flock of the Ossimi sheep reared at Giza district. Accordingly, it can be concluded that rearing the Ossimi sheep under upper Egypt conditions had no undesirable effect on its reproductive capacity.

Ewe lambs of both the Ossimi and the Saidi sheep which had been fed high plane had exhibited oestrus younger by 19.3 days than those received low plane of nutrition (347 v.s. 366.3 days). QUIRKE (1979) indicated

---

\* : each one Kg of Pfizer vita mineral contains: 6000000 I.U. vit. A, 1000000 I.U. vit. D<sub>3</sub>, 3500 I.U. vit. E, 2250 mg vit. B<sub>2</sub>, 5 mg vit. B<sub>12</sub>, 1500 mg vit. K<sub>3</sub>, 6000 mg niacin, 3500 mg pantothenic acid, 3000 mg Mn, 10000 mg Fe, 150 mg Cu, 150 mg Zn, 150 Mg I, 37500 Choline Chloride.

---

## PLAN OF NUTRITION

that ewe lambs fed ad libitum were attained puberty at a younger age than those on the restricted feeding regime. On the other hand, ALLEN (1979) reported that nutritional deprivation in early life did not affect the reproductive performance of the ewes.

The live weight at first oestrus in the Ossimi breed ranged from 28 to 44 Kg. with an average of 34.23Kg. In the Saidi sheep it ranged from 27 to 40 Kg. with an average of 34.7 Kg (Table 1).

Feeding Ossimi and Saidi ewe lambs higher daily allowances of S.V. and D.P. resulted in improvement average daily gain (Table 1). This improvement reached about 30%  $(105-80 \times 100)/80$  as compared with our expected figure of 100%  $(160 - 80 \times 100)/80$ .

### Conception rate:

Mating and conception rate are presented in Table (2). Present results illustrate that conception in the Saidi ewe lambs took place after one to two services with an average of 1.2 services. In the Ossimi ewe lambs it ranged from one to four services with an average of 1.36 services. HAFEZ (1953) reported averages of 1.1 and 2.2 services for the Rahmani and Ossimi ewe lambs, respectively.

Considering the effect of plane of nutrition on the number of services per conception it could be observed that conception in animals fed the high level took place after 1.4 services, while those received the low level of nutrition had a conception after 1.18 services. It may be suggested here that in the plane group; the first oestrus in many ewe lambs was not accompanied by ovulation.

In some cases silent heat took place between occurrence of first oestrus and the date of conception. Three cases of silent heat were observed for ewe lambs of the low plane group versus one case for the high plane group. This may be attributed to ovulation without oestrus or the early foetal mortality. TERRILL (1968) reported that the prolonged oestrus cycles resulting from ovulation without oestrus and early prenatal death of the embryo.

As shown in Table (2), it is clear that animals fed the high plane of nutrition attained their first conception at an earlier age than those fed the low plane. This is probably due to the occurrence of more frequent cases of silent heat and to the relatively late maturity of animals in the low plane group.

### Blood constituents:

It can be observed from the data in Table (3) that ewe lambs fed high level of nutrition had the highest averages of RBCs, Hb, total serum protein, glucose, calcium and inorganic phosphate than those fed low level. These results illustrate that improvement of nutritional status of the flock has good effects on blood constituents and in turn improved the physiological activity of the body. In this respect, EL-ALAMY and ABD EL-HAFIZ (1978) found that RBCs, Hb and total serum protein in male and female Jersey calves increased with the increase in the plane of nutrition. Also, BICKERSTAFFE *ET AL.* (1974) found significant and positive correlation between digestible energy intake and rate of glucose utilization in ruminants.

On the other hand, the activity of serum alkaline phosphatase was significantly ( $P < 0.01$ ) higher in the low group than in the high plane one. This may be attributed to the higher rate of bone growth in the low plane group at the time of sampling. This enzyme is considered as a catalyst in mineral metabolism and is associated with bone cell formation (SALEM *ET AL.* 1979). Also, KRUPP and CHATTON (1973) reported that children have an elevated alkaline phosphatase level as a result of bone growth. AGERGAARD and KATHOLM (1977) illustrated that the serum alkaline phosphatase is partially genetically controlled and also added that the determination of alkaline phosphatase activity should provide a useful criterion for the evaluation of potential growth in calves.

Results in Table (3) also show that the Saidi ewe lambs had the higher values of different blood constituents than the Ossimi ones except for calcium and inorganic phosphate content. In general the significant difference between the two breeds was found only for RBC's concentration. It was cited by DUKES (1955) that the number of erythrocytes varies widely within the species and within the individuals and is affected by sex, age, environment, nutrition status, exercise and other factors.

## REFERENCES

- Abou-Raya, A.K. (1967): "Animal Nutrition, Modern Practical Principles Feed Stuffs and Rations". Dar El-Maaref, Cairo, Egypt.
- Agergaard, N. and Katholm, J. (1977): Plasma alkaline phosphatase activity and isoenzyme composition as an indication of growth in calves. *Arsberething, Institut for Sterilitets Forskning Kongelige Veterinaer-09 Landabojskole*, 20 : 115.
- Alden, W.G. (1979): Under nutrition of the Merino sheep and its sequelae. V. The influence of severe growth restriction during early post-natal life on reproduction and growth of later life. *Aust. J. Agric. Res.*, 3: 939.
- Baginski, E., Marie, S., Clark, W. and Zak, B. (1973): Direct microdetermination of serum calcium. *Clin. Chim. Acta*. 46: 49.
- Belfield, A. and Golderg, D. (1971): Revised assay for serum phenyl phosphatase activity using 4-amino-antipyrine. *Enzyme*, 12: 561.
- Bickerstaffe, R. Anrison E.F. and Linzell, J.L. (1974): The metabolism of glucose-acetate, lipids and amino acids in the lactating dairy cows. *J. Agric. Sci.*, 82: 71.
- Dukes, H.H. (1955): Erythrocytes, Chapter 11 in the *Physiology of Domestic Animals 7th. Ed.* pp.23-24. Bailliere, Tindell and Cox, London.
- Dyrmondsson, D.R. (1973): Puberty and early reproductive performance in sheep. I. Ewe lambs. *Anim. Breed. Abstr.* 41: 273.
- El-Alamy, M.A. and Abd El-Hafiz, G.E. (1978): Nutritional and physiological studies in Jersey cattle, 11. Effect of plane of nutrition on blood picture and lysability of erythrocytes in young Jersey male and female calves. *Acta Agron. Acad. Sci. Hung.* 27: 411.
- El-Hommosi, F.F. (1981): The performance of fattening fat-tailed lambs implanted with zeronal under various nutritional regimes. *Acta Agron. Acad. Sci. Hung.* (in press).
- Garrett, W.N., Meyer, J.H. and Lofgreen, G.P. (1959): The comparative energy requirements of sheep and cattle for maintenance and gain. *J. Anim. Sci.*, 18: 528.
- Hafez, E.S.E. (1951): Sexual season in ewe lambs. *Nature*, 168-1046.
- Hafez, E.S.E. (1953): Puberty in female farm animals. *Empire J. of Exper. Agric.*, 21: 217.
- Keston, A. (1956): Specific colorimetric enzymatic analytical reagents for glucose. Abstracts of paper presented at the 129th Meeting of Am. Chem. Soc. Section, 31 C.
- Krupp, M. and Chatton, M. (1973): *Current Diagnosis and Treatment. Lange Med. Publ., Loss Altos, P. 948.*
- Macfate, R.P. (1972): "Introduction to the chemical laboratory" 3rd Ed. Year Book Medical Publ. Inc. Chicago, USA.
- Osman, A.M. and Baksai, E.H. (1970): Investigation on urinary estrogen excretion from ewes with special reference to the clinical condition of the genital tract. I. Estrous cycle. *Zbl. Vet. Med. A* 17: 889.
- Power, M. (1953): Inorganic phosphate, *Stand. Meth. Clin. Chem.* 1: 84.
- Quirke, J.F. (1979): Effect of body weight on the attainment of puberty and reproductive performance of Galway and Fingalway female lambs. *Anim. Prod.*, 28: 297.
- Salem, I.A., Mottelib, A.A. and Abd El-Hafiz, G.A. (1979): Nutritional studies of buffaloes during dry period. III- Variation in the activity of some serum enzymes. *Assiut Vet. Med. J.*, 6 (11): 63.
- Snedecor, G.W. and Cochran, W.G. (1967): "Statistical Methods". 6th Ed., Iowa state College Press. Iowa, USA.
- Terrill, C.E. (1968): Reproduction of sheep. In *Reproduction in Farm Animals. Chapter 15, 2nd E.S.E. Hafez. Pullman, Washington.*

## PLAN OF NUTRITION

TABLE (1)

Some reproductive characters of Ossimi and Saidi ewe lambs as affected by plane of nutrition.

Plane of nutrition	Breed		Overall average				Breed	
	Ossimi		Saidi		Treatment		Ossimi	Saidi
	Low	High	Low	High	Low	High	Ossimi	Saidi
No. of ewe lambs	12	13	12	11	24	24	25	23
Initial body weight (Kg)	21.46	21.86	20.41	21.28	20.93	21.60	21.66	20.80
SE ±	1.43	1.25	0.81	1.81	0.77	0.81	0.89	0.64
Ewe lambs which attained puberty <sup>+</sup>								
No.	11	11	11	9	22	20	22	20
%	92	85	92	82	92	83	88	87
Age at 1st Oestrus (days)	365.9	346.3	366.6	347.9	366.3	347.0	356.1	358.5
SE ±	12.3	9.7	17.9	11.9	10.6	7.4	7.9	10.8
Body weight at 1st Oestrus (Kg)	31.27	37.18	33.91	35.67	32.59	36.5	34.23	34.70
SE ±	0.83	1.29	1.23	1.07	0.78	0.85	0.99	0.83
Daily gain (gm) <sup>*</sup>	66	109	94	100	80	105	87	97
SE ±	7	6	7	5	5	4	6	6
Daily S.V. intake (Kg)	0.487	0.686	0.494	0.650				
SE ±	0.027	0.056	0.036	0.051				

<sup>+</sup> During the period from 1st of may 1980 to the end of February 1981.<sup>\*</sup> During experimental period.

TABLE (2)

Mating and conception rate of Ossimi and Saidi ewe lambs fed the two planes of nutrition.

Plane of nutrition	Breed		Overall average						Breed	
	Ossimi		Saidi		Treatment		Ossimi	Saidi		
	Low	High	Low	High	Low	High	Ossimi	Saidi		
No. of ewe lambs to ram	12	13	12	11	24	24	25	23		
Ewe lambs mated* to fertile ram										
No.	11	11	11	9	22	20	22	20		
%	92	85	92	82	92	83	88	87		
Ewe lambs returned to 1st service										
No.	2	4	2	2	4	6	6	4		
%	17	31	18	18	17	25	24	17		
No of services/conception	1.18	1.55	1.18	1.22	1.18	1.40	1.36	1.20		
Age at 1st conception (days)	370.5	356.6	363.3	355.1	366.9	355.7	363.4	359.6		
SE ±	11.9	9.3	14.4	10.2	9.2	6.7	7.6	8.9		

<sup>\*</sup> During the period from 15 May 1980 to the end of February 1981.

TABLE (3)

Effects of plane of nutrition on some blood constituents of Ossimi and Saidi ewe lambs

Items	Ossimi		Saidi		Significance	
	High	LOW	High	Low	Breed	Treatment
RBCs mill./mm <sup>3</sup>	5.21±0.17	4.77±0.08	5.46±0.24	5.40±0.12	**	N.S.
Hb g%	12.50±0.75	10.96±0.26	12.38±0.58	11.95±0.20	N.S.	N.S.
Total serum protein g%	7.04±0.07	7.0±0.10	7.25±0.12	4.14±0.12	N.S.	N.S.
Glucose mg%	49.21±2.15	38.18±1.98	50.20±2.11	37.55±1.56	N.S.	**
Calcium mg%	9.46±0.35	9.17±0.29	10.13±0.26	9.55±0.32	N.S.	N.S.
Inorganic phosphate mg%	8.41±0.34	7.97±0.42	8.56±0.43	7.60±0.80	N.S.	N.S.
Alkaline phosphatase I.U.	23.08±2.79	29.20±3.41	19.08±2/92	23.71±1.81	N.S.	**