

EFFECT OF PHOTO PERIODS INTENSITY ON FATTENING OF RAM LAMBS DURING WINTER AND SPRING

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SUMMARY

Body growth and dry matter intake (DMI) were measured on three crossbred group (Chios x Ossimi) of ram lambs. Each group (15 ram lambs) was fed ad-libitum on Egyptian clover (*Trifolium alexandrinum*) with restricted amount of barley grains (200 g./head/d.). The experiment started at the 1st of December (around 4 month of age) and was terminated by the end of March. Along the experiment period (4 mo.) the 1st group (A) was exposed to 16L (light) : 8 D (dark) hr. and the artificial light intensity was 300 lux. The 2nd group (B) exposed to natural day length a fair of light (10 lux.) all the night. The control group (C) was only subjected to the natural day length. The average daily gain (ADG) of the both A and B groups were greater (44.4% and 39.5 resp.) than C group. The light treatment groups (A and B) has consumed greater DMI (23.3% and 19.3% resp.). The results of this experiment indicated that arousing light at night has positive effect on growth rates and feed conversion efficiency. Continuous low light intensity during night for inspection purpose is more applicable and more economical during the winter and spring seasons.

Keywords: Rams lambs, growth, photoperiod

INTRODUCTION

Limited information's available on the effect of artificial photoperiod on growth of young market lambs and feed efficiency. Schanbacher and Crouse (1980) reported that lambs exposed to long day length gained weight faster than lambs had exposed to short day length but feed efficiency was not affected. It appeared to be worth while therefore, to investigate the effect of the experimentally controlled photoperiod intensities. The objective of this study is to evaluate the effect of various artificial lighting on growth rates and feed efficiency of feeder lambs.

MATERIALS AND METHODS

This study was conducted at the Mallawi Experimental Station which belongs to the Animal Production Research Institute, located 300 Km. south of Cairo (subtropical

zone 27° - 30N). The study aims to investigate lighting regimes on growth of lambs during months with short day lengths. The lambs born in August-September 1992, were kept with their mothers until weaning (8 weeks), then they were fed a starter ration *ad libitum* (17.5 CP, and 6.6 C. F.). Around 4 months of age, forty five crossbred (Chios × Ossimi) ram lambs were divided into three equal groups that were similar in the initial weights.

Beginning the 1st day of December, the 1st group (A) was exposed to natural day length (indirect sun light), plus cool white-florescent lamps (16L: 8D. hr.) for providing an artificial light intensity of 300 lux. The second group (B) was exposed to natural day length and it was provided with a continuous low light intensity (10 lux.). Animals in the B group had an opportunity to eat at any time of the night. The third group (C) was subjected only to natural day length light.

In each trail the lighted and unlighted pens were physically separated from each other to prevent "spill over" effects of lighting treatment into adjacent pens. These pens were closed houses with wide windows for good ventilation and natural illumination. Every 4 weeks multiple measurements of artificial light intensity were done by using Panlux Electronic, by measuring the illumination at as many points as possible placing the cell unit at animal eye level holding it parallel with this level and changing the positions according to the need, until there was not more than about 5% differences between the maximum and minimum values.

The animals were fed *ad-libitum* on Egyptian Clover (*Trifolium alexandrinum*), the common and favorable feed during the winter and spring seasons. The weighted Berssem was offered in two equal daily portions at 9:00 and 14:00 hr. Refused Berssem was weighed and recorded daily in the morning. A restricted amount of Barely grain (200 gm. /h./d.) was provided to avoid rumen disorders. During the experimental period (4 mo.) it was not possible to soil feed by tamping on it or with feces. All the groups of ram lambs were allowed to exercises for about one hour daily. So, neither health problems nor dead animals were observed. Feed samples were collected at approximately 4 week intervals and analyzed for dray matter in a forced air oven at 100°C for 48 hr. Mean dry matter intake per ram lamb in each group was calculated by-weekly.

Data were examined by statistical analysis (SAS 1989) and the General liner (GLM) was used. The main factor affecting lamb performance in this study was artificial light treatments. Duncan's multiple range test (DMRT) was utilized to detect differences among means.

RESULTS

Body weight of three groups of ram lambs are illustrated by Fig. (1). Both treatments provided supplemental artificial light had heavier body weights than the control group at the different stages of the trail. It is worthy to note that, marked differences were shown after the first month (December) of the trail. In additional the growth rates were much greater in the second and third months (January and February), than the final stage tended to stabilize.

The results shown in Table (1) indicate a significant stimulating of increased day length on average daily gain (ADG). Marked differences were found between light supplemented groups and control group (C), except at the 2nd month, which showed no significant difference between the C and B groups. In additional all the highest

ADG of ram lambs was found at 7 mo. of age (3rd month of the study). A marked drop in ADG was observed at 8 mo. of age (4th month of the study). So, sale at the moment is recommended. Table (2) illustrates that the lambs exposed to high light intensity (group A) consumed more DM (23.3%) than did animals subject only to the natural day length. Also the lambs in group B consumed more DM (19.2%) than group C.

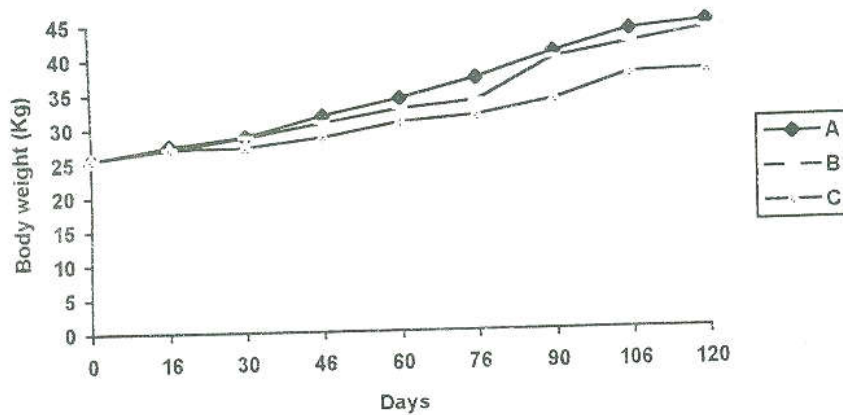


Fig. 1. Changes in body weight of ram lambs in response to varied light treatments.

Table 1. Monthly average daily gain (g/h) ± SD

Groups	1st mo.	2nd mo.	3rd mo.	4th mo.
(A)	145.56±27.79 a	150.00±20.89 a	197.78±33.25a	107.78±32.04 a
(B)	121.11±18.33 b	126.67±29.41 b	208.89±18.76a	123.33±38.73 a
(C)	75.56±16.51c	115.56±33.61 b	126.67±33.21b	98.89±41.05 b

Table 2. Monthly average daily dry matter intake (g/head)

Groups	1st mo.	2nd mo.	3rd mo.	4th mo.
(A)	760.00	1040.00	1177.80	1160.00
(B)	746.66	955.60	1150.60	1142.20
(C)	648.88	840.00	880.00	986.70

Tables (3 and 4) show that the two supplementary lighted groups (A and B) were also better in FCE than the control group. The averages were 7.21 and 7.12 for A and B groups respectively versus 8.17 Kg./Kg for the control group, that is a good explanation for why control group (C) had consumed more ration than A and B groups, for gain one Kg of live body weight. Each one Kg gain of control lambs group requires more Berseem (6 Kg.) and more barely grain(100 gm.) than those animal exposed to light treatments (Table 4).

Table 3. Monthly feed conversion efficiency (FCE)

Groups	1st mo.	2 nd mo.	3 rd mo.	4 th mo.
(A)	5.22	6.93	5.94 5.52	10.74
(B)	6.17	7.52	6.93	9.28
(C)	8.55	7.24		9.96

Table 4. Means of amount of Berssem and Barely consumption for production one Kg of live weight gain

Parameters	Group		
	(A)	(B)	(C)
F.C.E.	7.21	7.12	8.17
Berssem (DM) kg./kg. gains .	6.49	6.41	7.36
Berssem (Fresh) kg. /kg. gains .	40.50	40.10	46.00
Barely (DM) kg./kg. gains	0.72	0.71	0.81
Barely (Fresh) kg. /kg. gains .	0.79	0.78	0.89

DISCUSSION

The present study demonstrated that growth of ram lambs exposed to either a restricted photoperiod with high artificial light intensity (300 lux) or to a continuous low level of light (10 lux) were higher (44.4 and 39.5%) than the ADG of a control group (C), that were allowed only natural day length of light. These results are coincident with those found by Schanbacher and Crouse (1980). Petter *et al.* (1978) stated that a 16 L: 8D photoperiod increased body weight of Holstein heifers over that of animals subjected to natural photoperiods during autumn and winter seasons. In the present study, increased growth rates of ram lambs supplemental with artificial lighting was associated with greater consumption of feed. This occurred approximately 4 week from the beginning of the lighting treatment, the animals have been adapting to the light treatments during the first four weeks.

During the first week, the animals of A group were observed to be very nervous and try to escape from high light intensity. Nevertheless, feed to gain ratios were lower for ram lambs exposed to artificial light. Increasing the feed consumed by lambs exposed to artificial light treatments appears necessary for accelerating meat production. Similar observations on feed consumption and feed efficiency were made

by Forbes *et al.* (1975, 1979) and Schanbacher and Crouse (1980) in studies with lambs and Petitclerc *et al.* (1983) in studies with heifers. They added that the long photoperiod may increase rates of gain indirectly by stimulating appetite and feed consumption. This explanation is more logical because lambs are known to gain most rapidly when feed consumption is maximized and available at most times. Previous studies, Forbes *et al.* (1979) and Allen *et al.* (1984) found that growth hormone, insulin and thyroxin concentration in serum of sheep are unaffected photoperiod which is similar to findings in cattle by Leining *et al.* (1980). Thus, these hormones are not apparently involved in regulation of photoperiod induced changes in growth rate or feed intake. However, Forbes *et al.* (1975), Leining *et al.* (1979) Forbes *et al.* (1982) and Allen *et al.* (1984) reported that prolactin is responsive to change in photoperiod in ruminants. Prolactin concentrations in serum attained their maximum about 3 weeks sooner in animals given 16 L: 8D. Also Brinlow and Forbes (1983) added that infusion of prolactin increase N retention in sheep maintained in continuous darkness. Conversely, immunizing sheep against prolactin suppressed growth rates (Ohlson *et al.*, 1981).

According to these data, it is suggested that, it is beneficial when producing market lambs to increase day length artificially during short day of the year when better and cheaper green forage (Berseem) is available, it is way to apply under commercial and wide range of field conditions.

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تأثير شدة الاضاءة على تسمين الحملان خلال الشتاء والربيع

مصطفى توفيق موسى

معهد بحوث الإنتاج الحيوانى - محطة بحوث ملوى - المنيا - مصر.

تمت الدراسة بمحطة بحوث الانتاج الحيوانى بملوى وشملت على ٤٥ حولى خليط (كيوس × أوسيمى) ذات عمر فى حدود أربعة شهور. وتم تقسيم الحملان لثلاثة مجاميع متجانسة فى الأوزان تقريبا وفى العدد. المجموعة (أ) تعرضت لضوء النهار الطبيعى ثم الإضاءة الصناعية حتى ١٦ ساعة وبشدة اضاءة ٣٠٠ لكس و المجموعة (ب) تعرضت ايضا لضوء النهار ثم طول الليل لضوء خافت بشدة اضاءة ١٠ لكس. اما المجموعة (ج) عاشت تحت ظروف اليوم الطبيعى. وغذيت الحملان حتى الشبع بالبرسيم طوال ٤ شهور التجريبية (ديسمبر-مارس) مع ٢٠٠ جم شعير/راس يرميا وكان معدل النمو اليومى فى المجموعتان أ، ب اكبر من المجموعة (ج) بنسبة ٤٤,٤ ٪ و ٣٩,٥ ٪ على الترتيب. وايضا مجموعات المعاملة الضوئية (أ، ب) استهلكت مادة جافة اكثر من المجموعة (ج) بنسبة قدرها ٢٣,٣ ٪ و ١٩,٢ ٪ على الترتيب. ثم ان متوسط الكفاءة التحويلية كانت ٧,٢١، ٧,١٢، ٨,١٩ كجم./كجم. نمر للمجموعات (أ، ب، ج) على الترتيب. ونتائج هذه الدراسة دلت على ان الاضاءة الصناعية كانت لها تأثير معنوى على الصفات الانتاجية السابقة و لكن لم يكن هناك تأثير معنوى بين معاملتى شدة الاضاءة (أ، ب) على هذه الصفات بل ان المعاملة (ب) قد تكون افضل من الناحية التطبيقية و الاقتصادية خلال موسمى الشتاء و الربيع و المتوفر فيهما العلف الاخضر (البرسيم المصرى).