

SOME BEHAVIOURAL ACTIVITIES OF OSSIMI LAMBS
UNDER SUMMER CONDITIONS IN EGYPT.

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بعض الأنشطة السلوكية للحملان الأوسيمي تحت ظروف الصيف في مصر
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ملخص البحث

تم تسجيل النشاط المتعلق بالأكل والاجترار والشرب والراحة وكذلك بعض المقاييس الفسيولوجية (درجة حرارة الجسم - معدل التنفس - معدل النبض) لعدد تسعة حملان نكور أوسيمي ، وذلك تحت الظروف البيئية للصيف في مصر . وفى اليوم المحدد أسبوعياً تم تسجيل النشاط المتعلق بالأكل والاجترار والشرب والراحة من الساعة الثامنة صباحاً الى الساعة الخامسة مساءً ، ، بينما تم تسجيل المقاييس الفسيولوجية عند الساعة الثامنة صباحاً ، الثانية عشرة ظهراً ، الخامسة مساءً .

وقد أظهرت درجة حرارة الجسم ومعدل التنفس تغيراً مصاحباً للتغير فى درجة حرارة الجو - فقد سجلنا زيادة ملحوظة عند الساعة الثانية عشرة ظهراً عنها عند الساعة الثامنة صباحاً ، ثم انخفضت بعد ذلك عند الساعة الخامسة مساءً . كما كان معدل النبض أعلى ظهراً (الساعة الثانية عشرة) بالمقارنة بمعدله عند الساعة الثامنة صباحاً ، بينما كان مشابهاً لثيله عند الساعة الخامسة مساءً .

وقد استغرقت الحملان ٣٩,٧٤ ، ١٥,٢٢ ، ٠,٤٥ ، ٤٤,٥٩ ٪ من الوقت الكلى للملاحظة اليومى فى الأكل ، الاجترار ، الشرب ، الراحة على التوالى . وفى الأنشطة الأربعة المذكورة فقد أظهرت الحملان على طبل وقت الملاحظة أعلى مرات تكرار فى الأكل ، بينما كان أقل تكراراً ذلك المستخدم للاجترار . من حيث الوقت المستهلك فى كل مرة تكرار - فقد مثل الشرب أقصر وقت بينما استغرق نشاط الراحة أطول وقت ، وذلك بين الأنشطة المختلفة . وقد وجد أن متوسط كمية الشرب المستهلكة خلال وقت الملاحظة اليومى هو ٥,٢٠ لتر للرأس .

ABSTRACT

Eating, ruminating, drinking and resting activities as well as some physiological parameters, (rectal temperature, respiration rate and pulse rate) were recorded for nine Ossimi lambs under summer environmental conditions in Egypt. On a fixed day/week, the eating, ruminating, drinking and resting activities were recorded from 08.00 a.m. to 17.00 p.m., while the physiological parameters were recorded at 08.00 a.m., 12.00 noon and 17.00 p.m.

Rectal temperature and respiration rate showed a parallel change to that of ambient temperature. They increased at 12.00 noon than that at 08.00 a.m. followed by a decrease at 17.00 p.m. Regarding the pulse rate, it was higher at 12.00 noon than that at 08.00 a.m. and similar to that at 17.00 p.m.

The lambs spent, on an average, 39.74, 15.22, 0.45 and 44.59% of the time of observation/day in eating, ruminating, drinking and resting, respectively. In the four mentioned activities, the lambs over the time of observation appeared to have, on the average, the highest frequency in eating while the lowest frequency in ruminating. The average time spent per frequent recurrence indicated that drinking took the shortest time and resting the longest time among the different activities. The average amount of water consumed during the time of observation per day was 5.2 liters/head.

INTRODUCTION

The summer season of Egypt is characterized by a relatively high ambient temperature and insufficient pasture. Sheep depend for feeding mainly on dry feed. The heat stress imposed on the animals by high ambient temperature will introduce reactions in the ingestive behaviour as well as in the physiological activities of the animals which enable these animals to survive and perform under these conditions. However, much of the experimental studies in this respect have been carried out to investigate either the reaction in physiological activities (El-Sheikh *et al.*, 1981a with Barki lambs and El-Sheikh *et al.*, 1981b with Barki, Ossimi, Rahmani and some foreign breeds of sheep); or the change in ingestive behaviour

(Kandil et al., 1979 with Ossimi sheep and Moukhtar Abd-Ellatif et al., 1980 on Baladi goats).

The present work dealt with some physiological parameters; respiration rate, pulse rate and rectal temperature as well as eating, rumination, resting and drinking activities of Ossimi lambs under summer environmental conditions in Egypt. Investigating this will throw more light on such important criteria, which may help in planning the management practices.

MATERIALS AND METHODS

The present experiment was carried out during mid-summer 1986 at the Animal Production Experimental Farm, Faculty of Agriculture, Minufiya University, Shebin El-Kom, Egypt. Nine non-shorn male Ossimi lambs of about 8 months of age were used.

During the experimental period, the lambs were kept in semi-open shed and were fed clover hay, concentrate mixture and wheat straw. Lambs were kept under these conditions for two weeks prior to the experiment.

Eating, ruminating, drinking and resting activities as well as physiological parameters were recorded individually for all lambs once a week, for five weeks starting with the first week of July, 1986. The physiological parameters were recorded on a fixed day each week at 08.00 a.m., 12.00 noon and 17.00 p.m. Respiration rate was measured by counting flank movement during one minute, while pulse rate by a clinical stethoscope through one minute. Rectal temperature was measured by a clinical thermometer. Ambient temperature and relative humidity were recorded by a hygrothermograph located in the middle of the pen.

The ration was offered in a single daily meal tacking place in the morning at 08.00 a.m. Eating, ruminating, resting and drinking activities; the time spent as well as the frequency of each were recorded continuously for each lamb on each day of observation from 08.00 a.m. to 17.00 p.m. All lambs were with free access to a known volume of fresh water which available allover the same period on each day of observation and the average amount of water consumed was estimated. All lambs were treated for internal and external parasites prior to experimentation.

Statistical analyses were carried out according to Gill (1978).

RESULTS AND DISCUSSION

The meteorological data recorded during the days of observation for the area under which the sheep were maintained are summarized in Table (1). The mean values of rectal temperature, respiration rate and pulse rate of Ossimi lambs measured at 08.00 a.m., 12.00 noon and 17.00 p.m. are shown in Table (2). Rectal temperature and respiration rate changed throughout the time of observation in a pattern parallel to that of ambient temperature. They significantly increased at 12.00 noon than that at 08.00 a.m. followed by a decrease at 17.00 p.m. Regarding the pulse rate, it was significantly higher at 12.00 noon than that at 08.00 a.m. and similar to that at 17.00 p.m. Younis et al. (1977) working with Awassi lambs found that both rectal temperature and respiration rate tended to increase paralleling the increase in ambient temperature. In general, the results obtained in the present work indicate the importance of cardiorespiratory activities to counteract excessive heat. The pulse rate increased including improved blood flow, pumbed by the heart, which carries heat from the interior to the surface of the

Table (1): The meteorological data recorded during period of experiment for area under which the sheep were maintained.

At time	Mean ambient temperature (°C)	Mean relative humidity %
08.00 h	29.2	49.0
12.00 h	37.1	25.3
17.00 h	36.2	28.7

Table (2): Rectal temperature, respiration rate and pulse rate of Ossimi lambs. (Mean \pm SE).

At time	Rectal temperature	Respiration rate	Pulse rate
08.00 h	38.8 \pm 0.05	75.2 \pm 3.6	91.4 \pm 1.7
12.00 h	39.6 \pm 0.04	121.8 \pm 3.3	117.2 \pm 2.1
17.00 h	39.3 \pm 0.04	103.3 \pm 3.9	117.2 \pm 1.6

body for dissipation. In association with pulse rate, the respiration rate was also increased, so providing another important avenue of evaporative cooling. However, Yeates et al. (1975) reported that the excessive increase in respiration rate proper carries with it the danger that excessive amounts of carbon dioxide will pass out of the blood into the expired air, with a consequent shift of the body's acid-base balance to the too alkaline side. On the other hand, the response found in the present work differed with that of Barki lambs, whose respiratory rate was significantly increased with a non-significant increase in rectal temperature, while pulse rate was significantly decreased as a result of exposure to heat accompanied with solar radiation and thirst, as reported by El-Sheikh et al. (1981 a). Accordingly, it can be suggested that Ossimi lambs in the present work were more heat stressed and a higher heat load. The differential physiological response to heat between Ossimi lambs in the present work and Barki lambs in the experiment of El-Sheikh et al. (1981 a) could be attributed to either breed differences or/ and to different measuring conditions and management practice. Differences in the rate of response to heat have been reported among local breeds (El-Sheikh et al., 1981 b). Since the Ossimi lambs in the present experiment were penned in a semi-open shed over the experimental period, it can be expected that the physiological reaction may be affected. This proposal has been confirmed by findings of some workers. Bligh (1970) reported that restraining sheep in pens can influence physiological responses. Berman and Morag (1971) stated that animals studied in a hot natural climate appear less stressed than those in a climatic chamber at similar ambient temperatures. On the other hand, El-Sheikh et al. (1981 a) reported that the decrease in pulse rate of Barki lambs recorded post-exposure to heat suggests a depression of heat production and indicates a mid-summer heat-acclimatization of these animals.

Eating, rumination, drinking and resting behavioural activities of Ossimi lambs are shown in Table (3). Over the time of observation, the time spent in different activities can be classified in a descending order as resting, eating, rumination and drinking. Ossimi lambs spent 44.59, 39.74, 15.22 and 0.45% of the total time of observation/day in resting, eating, rumination and drinking, respectively. It can be suggested that the high ambient temperature of summer reduced the appetite of the lambs which in turn tended to rest at the expense of times spent in the other activities, so it seems that time spent resting was increased. Fraser (1974) reported a reduction in desire for food during high temperatures. Gabr et al. (1986) found that in summer season feeding time of both ewes and weaned lambs was reduced at maximum. In addition, the increase in respiration rate is known to increase heat production (Kamal, 1965). The relation between pulse rate and heat production was also reported (Yousef and Johanson, 1966). It can be concluded, therefore, that the increase in the physiological parameters of Ossimi lambs in the present work appeared to increase heat load on lambs and consequently their appetite was reduced, resulting in a relatively more time spent resting. This latter proposal has been confirmed by Yeates et al. (1975) who stated that increased physical exertion of faster breathing generates more heat, which in turn has to be dissipated, and it no doubt also interferes with the physical processes of grazing and rumination. Brown (1971) showed the relation between behavioural activities such as shade seeking and grazing and thermoregulating mechanisms.

The average rate of recurrence as well as the duration of each frequent recurrence for each of eating, rumination, drinking and resting over the time of observation are shown in Table (3). In the four mentioned activities, the lambs appeared to have, on the average, the highest frequency in eating while the lowest frequency in

Table (3): Average eating, rumination, drinking and resting activities of Ossimi lambs over the time of observation/day.

Item	Eating	rumination	drinking	resting
Rate of recurrence (Frequency)	13.50	5.01	9.75	12.50
Time spent per frequent recurrence (minutes)	15.90	16.41	0.25	19.26
Total time (minutes)	214.60	82.20	2.40	240.80
Total time as % of total time of observation	39.74	15.22	0.44	44.59

ruminating. The average time spent per frequent recurrence indicated that drinking took the shortest time and resting the longest time among the different activities.

Water consumption and frequency of drinking is of great importance in summer time due to the high ambient temperature and where sheep rely on dry feeds. Water is lost when sheep are heat stressed, therefore, the water intake increases with environmental temperature. The average amount of water consumed by the lambs in the present work during the time of observation per day was found to be 5.20 liters per head. Clark and Quin (1949) studying Merino sheep in South Africa, have shown that on days with a high maximum air temperature (between 29.5° and 37.5°C), water intake of penned sheep in the open, on a hay diet, was just over four liters; at temperature 5.5° below this, water intake was approximately three liters. Accordingly, it seems that Ossimi lambs in the present work (on concentrate mixture, clover hay and wheat straw) increased their water intake when exposed to high air temperature in summer and that they rely on evaporative cooling mechanism for the preservation of heat balance. Since the lambs are in free access to available water, it is likely to suggest that they maintained their total body water content.

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