INFLUENCE OF HOUSING CONDITIONS FOR SHEEP PERFORMANCE DURING HOT SUMMER UNDER NORTH OF UPPER EGYPT.

Ali R. Abd El-Rahman and Mona A. El-Khashab.
Animal Production Department, Fac. Agric., Fayoum Univ. Egypt.

ABSTRACT :

This study was carried to evaluate the impact of housing conditions on lamb performance in newly reclimated land under hot summer climate in north Upper Egypt (Fayoum province area). In this respect, the small ruminant breeders keep their animals in two different housing conditions, free in yard under shade (YS) or in yard without shade (YN). For this reason, a total number of 10 growing Ossimi lambs and 10 growing Saidi lambs were used in this study during summer months (June to September). Animals of each breed were divided into two separate housing conditions. Physiological responses in terms of rectal temperature (RTºC), respiration rate (RR) and water consumption (L/h/day) and blood samples in addition to the ambient temperature (AT ºC) were determined simultaneously at the last day of each 3 week interval through the experiment months at three times, 7:00 a.m; 1:00 p.m and 6:00 p.m. Blood samples were collected to obtain blood serum. The serum was used to assess blood proteins. In –vivo chemical body composition was assessed in final experiment.

The rectal temperature (RT, ºC) of Ossimi lambs (39.2 ºC) was higher ($P \leq 0.05$) than Saidi lambs (38.8 ºC). Moreover, the RT under YN system (39.1ºC) was significantly high ($P \leq 0.05$) compared with YS system (38.9ºC).

Significant difference ($P \leq 0.01$) in respiration rate (RR) was observed between the two breeds. The environmental conditions of YN housing significantly increased ($P \leq 0.01$) RR in both breeds. The averages were 60.6 and 63.5 RR in YN and YS conditions, respectively.

There was significant ($P \leq 0.05$) differences between the two breeds in water consumption. Saidi sheep consumed more water (1.85 L/h/day) in mid day than that of Ossimi sheep (1.66 L) under the two systems. Serum of Ossimi lambs contained more total protein in the 1st and 2nd time of measurements (7.49 and 7.55 g/dl) than Saidi lambs (7.27 and 7.16 g/dl) respectively. While the corresponding values in Ossimi were lower in the 3rd time (7.30 g/dl) than Saidi lambs (7.48 g/dl).

Data revealed that, water, fat and ash percentages of body lambs were higher under YS housing condition than those raised under YN conditions. Lambs, raised under YS condition had the highest values of final body weight, total gain, daily gain and superlative values of feed efficiency and feed conversion.

Carcass traits were more better significantly ($P \leq 0.05$ and $P \leq 0.01$) in Saidi lambs than that in Ossimi lambs except the weight of edible organs and dressing percentage.

It could be concluded that raising Saidi and Ossimi lambs in yards with wooden shade improve the net revenue and relative economic efficiency compared with those raised under unshade condition systems, while Saidi lambs were more better than Ossimi lambs under YS housing conditions in north Upper Egypt.

Key words: Housing, Sheep, Summer, Physiological Responses, Growth performance.

INTRODUCTION

In hotter climates of the north Upper Egypt in Fayoum province area, shade is very important and effective for reducing summer heat. It is considered to be essential to maintain the physiological performance, productive efficiency, economical benefits and can be necessary for survival under such prevailing hot conditions.

The sub-tropical arid climate as in the newly reclimated land is characterized by a long hot summer season (April to October), which represents the important stage in sheep productivity. In such hot climate, the lambs suffer from the direct and indirect solar radiation. Solar radiation, ambient temperature, relative humidity are the most important environmental factors that influence effective temperature. When the temperature exceeds 27°C even with high humidity the effective temperature is above the comfort zone of sheep. These conditions induce physiological and biochemical changes which impair the animal productivity **(El-Khashab and Abd El-Rahman 2001, Yousef *et al.*, 1997 and Habeeb *et al.*, 1992).** Protection of the animals from the direct solar radiation of the hot season by providing shade in order to improve climatic conditions may help the animals to express their genetic potentiality **(Razzaque and Ibnoaf, 1990; Mari *et al.*, 1992, Davis *et al.*, 1994, Hatem, 1999 and Abd El-Rahman 2006)**.

The objective of this investigation was to evaluate the physiological, productive and economical benefits of shade for growing Ossimi and Saidi lambs during hot and arid summer conditions.

MATERIALS AND METHODS:

A total of 20 growing sheep lambs (10 Ossimi and 10 Saidi) of about 7 and 8 months of age and averaging 29.4 kg ± 1.6 and 30.5 kg ± 1.5 of body weight, respectively were used under shaded and non-shaded conditions of housing. This study was carried out during summer season (June to September) months in north Upper Egypt (Fayoum governorate area). The average of air temperature (AT °C) in this area during the three daytimes (7.00 a.m, 1.00 p.m and 6.00 p.m) were ranged between 19°C and 37.5°C, with an average of 28.4°C. Meanwhile, the corresponding average of relative humidity (RH,%) was 22% and 80%, with an average of 51%. Animals were divided into two equal separate groups (5 of each breed). The first group was housed in yard with central wooden shade (YS), while the second group was raised in yard without shading under natural solar radiation (YN). Lambs were fed on concentrate feed mixture and yellow corn grains as the concentrate part of ration and chopped berseem hay at amount of 30% for total ration to cover maintenance and growth requirements according to NRC allowance (1985). Also, fresh water was allowed freely to animals. The chemical composition of feeds are shown in Table (1). Physiological responses in terms of rectal temperature (RT, °C), respiration rate (RR rpm) and water consumption (WC L/h/day) and blood samples in addition to the ambient temperature (AT, °C) were determined simultaneously, at last day of each 3 week interval throughout experimental months, at three times, 7.00 a.m, 1.00 p.m, and 6.00 p.m. in the two housing conditions. Blood samples were collected in tubes without anticoagulant to obtain blood serum. The serum was used to assess blood protein according to **Oser (1979)**.

In–vivo chemical body composition (water, fat, protein and ash percentages) were assessed in final experiment using antipyrine-space technique as reported by **Fekry (1984)**.

Lamb wee individually weighed at weekly intervals until the end of experimental period and the changes in live body weight (BW) and feed intake (FI) were recorded. Average daily gain (ADG), feed conversion (FC) and feed efficiency and DM intake were calculated.

At the end of the experiment, all animals were fasted and weighed. Three animals were randomly chosen from each group. Animals were slaughter by Moslem methods. Weight of edible organs, liver, heart, kidneys, spleen, testes and lungs were recorded. The warm carcass was weighed without any attached offal's and then split into two sides. The left side was physically dissected into lean, fat and bone, and those were separately weighed. Statistical analysis of the data were made according to **SPSS (1997)** including analysis of variance and Duncan's multiple range test (1955).

Table (1): Chemical composition of feed (on DM basis).

Item	DM %	% DM					
		OM	CP	EE	CF	NFE	Ash
Concentrate mixture	90.40	38.33	14.30	3.35	17.92	52.76	11.67
Yellow corn	90.28	88.33	10.00	5.30	5.00	77.74	1.95
Berseem hay	90.32	88.78	10.62	1.50	28.38	58.98	11.22

RESULTS AND DISCUSSION:

Rectal temperature, respiration rate and water consumption:

The average of RT, RR and WC in the two breeds under the types of housing conditions are illustrated in Table (2). The data showed that WC of Ossimi sheep lambs at 7.00 a.m. (0.64L) and 6.00 p.m. (0.78L) was higher ($P \leq 0.01$) than that of Saidi sheep lambs (0.60 and 0.76) respectively, while the opposite trend was observed in the same parameter at 1.00 p.m. At the same time, respiration rate (rpm) at 1.00 p.m. and 6.00 p.m. in Ossimi lambs (61.0 and 49.9 rpm) was higher significantly ($P \leq 0.01$ and $P \leq 0.05$) compared with Saidi lambs (57.5 and 48.8 rpm), respectively. While RR and WC were higher significantly in YN system than in YS conditions at 1.00 p.m. and 7.00 p.m. The interaction effect showed that Ossimi lambs raised under the YN conditions tended to have higher ($P \leq 0.05$ and $P \leq 0.01$) RR and WC. While dissimilar trend was noticed in WC at 1.00 p.m. Also, the same trend was observed in Saidi lambs which raised under the same conditions. There was variation in WC either at YS or YN at 1:00 pm. measure which parallel with the variation in RR. These two parameters were related to the change in AT. The observed results agree with the finding of **Hassanin *et al.* (1996) and El-Khashab and Abd El-Rahman (2001)** who reported that variation in WC and RR of sheep were positively correlated with the change in ambient temperature. **Hatem (1999)** studied different types of housing system for sheep under Egyptian climate, he pointed out that the outside and inside environmental conditions and thermal heat exchange (conduction and convection) from the house elements affected the RT and RR. Mohr and **Wanek (1995)** reported that increase in RR in sheep between morning and afternoon was due to the gradual rise in ambient temperature and the increase in body activities of the animals. Also, body temperature of the animal was associated with the time of food presentation.

The variation in WC of Ossimi and Saidi sheep shows that the WC at 7.00 a.m. was lower than the amount at 1.00 p.m. or at 6.00 p.m. (Table 2). Moreover, the WC in both Ossimi and Saidi at1.00 p.m. were greater compared with any daytime. This means that the WC during the hot period of the day was higher. In Saidi sheep the WC at 1.00 p.m. represented 60% of the WC during the day. The corresponding value in Ossimi was 55%. **El-Badawi and Gado (1997)** reported that water intake, in goats significantly increased (P≤0.01) with increasing AT from 14°C to 28°C, and daily water intake was more closely correlated with dry matter intake and body weight.

Table (2): Thermo-responses (RT, °C and RR ,rpm) and water consumption of Ossimi and Saidi lambs at three daytimes (as affected by breed difference, housing conditions) and their interactions.

Items	Breed effect		Housing effect		Interaction effect				SE
					YS		YN		
	Ossimi	Saidi	YS	YN	Ossimi	Saidi	Ossimi	Saidi	
A.T at 7.00am	-	-	19.9°c	19.0°c	19.9°c		19.0°c		
Rectal temperature (°c)	39.2	38.8	38.9	39.1	39.1	39.7	39.3	38.9	0.57
Respiration rate (rpm)	48.5	47.8	48.0	48.3	48.5	47.5	48.6	48.1	5.1
Water consumption**	0.64^{b}	0.60^{b}	0.53^{c}	0.70^{a}	0.56^{c}	0.51^{c}	0.72^{a}	0.68^{a}	0.2
A.T at 1.00 p.m	-	-	32.5°c	37.5°c	32.5°c		37.5°c		-
Rectal temperature (°c)	39.8	39.4	39.5	39.7	39.6	39.3	39.9	39.5	0.57
Respiration rate (rpm)**	61.0^{a}	57.5^{b}	56.4^{b}	62.05^{a}	58.5^{b}	54.3^{c}	63.5^{a}	60.6^{a}	6.22
Water consumption (L)**	1.66^{d}	1.85^{a}	1.71^{cd}	1.80^{b}	1.60^{d}	1.82^{a}	1.73^{c}	1.87^{a}	0.29
A.T at 6.00 p.m	-	-	25.6°c	28.0°c	25.6°c		28.0°c		-
Rectal temperature (°c)	39.6	39.0	39.2	39.4	39.5	38.9	39.7	39.1	0.47
Respiration rate (rpm)*	49.9^{a}	48.8^{b}	49.05^{a}	49.7^{a}	49.6^{a}	48.5^{b}	50.2^{a}	49.2^{a}	5.18
water consumption (L/h/day)**	0.78^{b}	0.76^{b}	0.72^{c}	0.82^{a}	0.72^{c}	0.71^{c}	0.83^{a}	0.81^{a}	0.06

* P ≤ 0.05; ** P≤0.01

a, b, c…. Means within the same row with different superscripts are significantly different at P≤ 0.05

YS. Yard with central wooden shade.

YN. Yard without shade under natural solar radiation.

The data in Table (3) revealed significant differences (P≤0.05 and P≤0.01) between the two breeds in total protein, albumin and globulin (g/dl). Ossimi lambs had more total protein (g/dl) at the 1st and 2nd time of measurements (7.49 and 7.55) than those in Saidi lambs (7.27 and 7.16) respectively. While, the opposite trend was observed at the 3rd time (7.30 vs. 7.48 g/dl), however this differences was not significant. With respect to the interaction effect as shown in Table (3). Ossimi and Saidi sheep lambs raised under YN condition tended to have higher values of serum TP, Alb and Glb, at 7.00 a.m. than those raised under YS conditions. On the other hand, the opposite trend was noticed at 1.00 and 6.00 p.m. measures. These findings agree with the results of **Ilieve *et al.* (1998)** who pointed out that the concentration of TP in serum was affected by housing condition. The housing conditions show a significant effect on chemical body composition of both breeds as presented in Table (4). Data revealed that there was significant increase (P≤0.05) in water, fat and ash % in lambs raised under YS housing conditions than the other lambs kept under YN condition. The interaction between housing and breed effects were significant (P≤ 0.05) and highly significant (P≤0.01) on chemical body composition in both Ossimi and

Saidi lambs. Housing conditions show a significant effect (P≤0.05) on body water, fat and ash, meanwhile this effect was highly significant (P≤0.01) on body protein. Lambs, of both breeds, raised under YN conditions showed low body percentages of water, fat and ash, whereas the body protein percentage was high. However, Ossimi lambs were greatly affected by housing condition than Saidi lambs. The high AT °C caused stress on the sheep body where heat dissipation was decreased as increase in AT °C, which increase the rate of fat catabolism **Nasholm (1990)**.

Table (3): Mean serum proteins (g/dl), serum albumin and serum Globulin (g/dl) of Ossimi and Saidi lambs at three daytimes (as affected by breed difference, housing conditions) and their interactions.

Items	Breed effect		Housing effect		Interaction effect				SE
					YS		YN		
	Ossimi	Saidi	YS	YN	Ossimi	Saidi	Ossimi	Saidi	
A.T °C 7.00 a.m.	-	-	19.9°c	19.0°c	19.9°c		19.0°c		-
Total protein, **	7.49^{a}	7.27^{b}	7.23^{b}	7.53^{a}	7.35^{b}	7.11^{c}	7.62^{a}	7.43^{b}	0.19
Total albumin, **	4.49^{a}	4.27^{b}	4.33^{b}	4.44^{a}	4.44^{a}	4.21^{c}	4.54^{a}	4.33^{b}	0.15
Globulin, *	3.00^{a}	3.00^{a}	2.90^{b}	3.09^{a}	2.91^{b}	2.90^{b}	3.08^{a}	3.10^{a}	0.11
A.T °c 1.00 p.m.	-	-	32.5°c	37.5°c	32.5°c		37.5°c		-
Total protein, **	7.55^{b}	7.16^{d}	7.52^{b}	7.20^{d}	7.73^{a}	7.30^{c}	7.38^{c}	7.01^{e}	0.29
Total albumin, **	4.37^{ab}	4.20^{b}	4.40^{a}	4.07^{c}	4.51^{a}	4.28^{b}	4.22^{b}	3.92^{c}	0.11
Globulin, *	3.18^{a}	2.96^{b}	3.12^{a}	3.13^{b}	3.22^{a}	3.02^{b}	3.16^{a}	3.09^{b}	0.35
A.T °c 6.00 p.m.	-	-	25.6°c	28.0°c	25.6°c	25.6°c	28.0°c	28.0°c	-
Total protein, **	7.30^{a}	7.48^{a}	7.18^{b}	7.11^{b}	7.31^{a}	7.04^{c}	7.28^{ab}	6.91^{c}	0.41
Total albumin, **	4.26^{a}	4.10^{b}	4.17^{b}	4.05^{b}	4.40^{a}	4.11^{b}	4.11^{b}	3.99^{c}	0.35
Globulin, **	3.04^{b}	3.38^{a}	3.01^{b}	3.06^{b}	2.91^{c}	2.93^{c}	3.17^{ab}	2.92^{c}	0.07

* P ≤ 0.05; ** P≤0.01

a,b,c…Means within the same row with different superscripts are significantly different at P≤ 0.05

YS. Yard with central wooden shade.

YN. Yard without shade: under natural solar radiation.

Table (4). Chemical body composition (%)of Ossimi and Saidi lambs as affected by breed difference, housing conditions and their interactions.

Body Composition	Breed effect		Housing effect		Interaction effect				SE
					YS		YN		
	Ossimi	Saidi	YS	YN	Ossimi	Saidi	Ossimi	Saidi	
Water %*	63.44^{a}	62.82^{b}	63.77^{a}	62.49^{b}	64.03^{a}	63.51^{a}	62.85^{b}	62.12^{c}	1.09
Protein %**	17.35^{b}	17.41^{b}	16.44^{c}	18.31^{a}	16.52^{c}	16.36^{c}	18.17^{a}	18.45^{a}	0.08
Fat %*	16.04^{c}	16.49^{a}	16.49^{a}	16.04^{c}	16.20^{b}	16.77^{a}	15.87^{c}	16.21^{b}	0.29
Ash %*	3.17^{b}	3.28^{a}	3.30^{a}	3.16^{b}	3.25^{a}	3.36^{a}	3.11^{b}	3.22^{b}	0.07

* P ≤ 0.05; ** P≤0.01

a, b, c…. Means within the same row with different superscripts are significantly different at P≤ 0.05

YS. Yard with central wooden shade.

YN. Yard without shade: under natural solar radiation.

Feed intake, feed conversion and growth performance:

Table (5) shows the effect of breed and housing conditions on growth performance, feed intake and feed conversion of both breeds. Data indicate that lambs raised under YS showed the highest values of final body weight, total gain, daily gain and superlative values in feed efficiency and feed conversion. These results may be due to the improvement of nutrient digestibility. Shading conditions improved markedly the growth performance traits by reducing the negative effect of solar radiation and increasing feed efficiency and conversion **Davis *et al.* (1994)**. The interaction between housing and breed effect was significant (P≤ 0.05) and highly significant (P≤0.01) on all studied parameters. This could be attributed to the high effect of heat stress on the native breeds in early ages.

Table (5). Productive performance traits of Ossimi and Saidi lambs as affected by breed difference, housing conditions and their interactions.

Items	Breed effect		Housing effect		Interacting effect				SE
					YS		YN		
	Ossimi	Saidi	YS	YN	Ossimi	Saidi	Ossimi	Saidi	
No. of lamb	5	5	5	5	5	5	5	5	
Days of experiment	122	122	122	122	122	122	122	122	
Total gain g%**	21.65^{c}	21.96^{c}	23.03^{a}	20.61^{d}	23.48^{a}	22.57^{b}	19.87^{d}	21.85^{c}	0.71
Daily gain gm*	177.5^{c}	180^{c}	188.8^{ab}	168.9	192.5^{a}	185^{b}	162.9^{d}	175^{c}	3.6
Feed intake/day, gm**	1351.28^{d}	1295.84^{bc}	1379.28^{a}	1267.84^{c}	1447.4^{a}	1311.52^{b}	1255.52^{c}	1280.16^{c}	20.8
Feed efficiency*	0.13^{b}	0.14^{a}	0.14^{a}	0.13^{b}	0.13^{b}	0.14^{a}	0.13^{b}	0.14^{a}	0.006
Daily DM intake, gm/h/day**	1206.5^{b}	1157^{c}	1231.5^{a}	1132^{c}	1292^{a}	1171^{c}	1121^{c}	1143^{c}	18.3
Feed conversion kg DM/kg gain*	6.8^{a}	6.43^{b}	6.52^{b}	6.7^{a}	6.71^{a}	6.33^{b}	6.88^{a}	6.53^{b}	0.35

* P ≤ 0.05; ** P≤0.01

a, b, c…. Means within the same row with different superscripts are significantly different at P≤ 0.05

YS. Yard with central wooden shade.

YN. Yard without shade: under natural solar radiation.

Carcass traits:

The effects of breed and type of housing on some carcass traits of sheep lambs are presented in Table (6). Carcass traits were more better (P≤0.05) and (P≤0.01) in Saidi lambs than that in Ossimi lambs, except the weight of edible organs, and dressing percentage. The superiority of Saidi breed and YS housing type may be due to the superiority of Saidi lambs in feed utilization and efficiency tolerance for harsh condition of housing.

Economical evaluation:

Regarding the simple economical evaluation (Table 7) raising Saidi lambs in yards with wooden shade improve the net revenue and relative economic efficiency compared with those raised under unshaded condition in north Upper Egypt. The relative percentage of net revenue were 121.4, 124.9, 100 and 114.3 for Ossimi and Saidi lambs under YS and YN condition,

In conclusion, raising Ossimi and Saidi sheep lambs in yard with shade is successful for fattening lambs. Wooden shades under high environmental temperature and intensive solar radiation improve markedly lambs performance

by increasing feeding values, feed conversion, carcass traits and economical efficiency.

Table (6): Carcass traits of Ossimi and Saidi lambs as affected by breed difference, housing conditions and their interactions.

Items	Breed effect		Housing effect		Interaction effect				SE
					YS		YN		
	Ossimi	Saidi	YS	YN	Ossimi	Saidi	Ossimi	Saidi	
Slaughter weight, kg*	51.08^{b}	52.46^{a}	52.96^{a}	50.58^{b}	52.85^{a}	53.07^{a}	49.30^{b}	51.85^{a}	2.13
Carcass weight , kg **	25.79^{b}	26.92^{a}	27.26^{a}	25.44^{b}	27.06^{a}	27.46^{a}	24.51^{b}	26.37^{a}	1.65
Edible organs , kg[1]	2.1	2.1	2.14	2.06	2.16	2.11	2.03	2.09	0.4
Dressing, %[2]	50.46	51.31	51.48	50.29	51.2	51.75	49.71	50.86	1.01
Carcass lean , kg*	13.52^{b}	13.6^{b}	14.17^{a}	12.95^{c}	14. 40^{a}	13.94^{a}	12.64^{c}	13.25^{b}	0.96
Carcass fat , kg*	7.9^{a}	7.51^{b}	8.11^{a}	7.30^{b}	8.52^{a}	7.70^{b}	7.28^{b}	7.32^{b}	0.41
Carcass bone ,kg*	4.36^{c}	5.84^{a}	4.99^{b}	5.20a^{b}	4.13^{c}	5.86^{a}	4.59^{c}	5.81^{a}	0.34
Carcass lean% CW*	52.39^{a}	50.44^{b}	51.99^{b}	50.90^{b}	53.22^{a}	50.75^{b}	51.56^{b}	50.23^{b}	1.17
Carcass fat %CW**	30.6^{a}	27.9^{d}	29.77^{b}	28.73^{c}	31.50^{a}	28.04^{c}	29.7^{b}	27.75^{d}	1.06
Carcass bone % CW**	17.01^{d}	21.62^{a}	18.25^{c}	20.38^{b}	15.28^{e}	21.20^{a}	18.74^{c}	22.02^{a}	0.92
Coefficient of meat in Whole carcass[3**]	4.99^{a}	3.62^{c}	4.66^{b}	3.94^{c}	5.36^{a}	3.64^{c}	4.34^{b}	3.54^{c}	0.29

* $P \leq 0.05$; ** $P \leq 0.01$

a, b, c…. Means within the same row with different superscripts are significantly different at $P \leq 0.05$

1, included liver, heart, kidneys, testes and lung.

2, Carcass weight/ slaughter weight × 100.

3, Carcass lean+ Carcass fat, kg/ Carcass bone, kg

Table (7): Economical efficiency of the tested housing condition throughout the experimental period (122 days).

Items	YS		YN	
	Ossimi	Saidi	Ossimi	Saidi
Cost of daily feed intake[1] ,L.E.	1.87	1.61	1.54	1.57
Cost of total feed intake, L.E.	217.16	196.42	187.88	191.54
Price of daily gain[2],L.E.	3.27	3.15	2.77	2.98
Price of total gain ,L.E.	399.16	383.69	337.79	362.95
Net revenue whole period, L.E.	182.0	187.27	149.91	171.41
Relative economic efficiency,%	121.4	124.9	100.0	114.3

1, include the price of one kg (L.E.) of concentrate mixture (1.15), corn yellow grains (1.20) and berseem hay (0.70).

2, daily gain price of kg live body weight (17 L.E.).

REFERENCES

Abd El-Rahman, A.R. (2006). Influence of housing system on growth performance of Baladi male calves raised under Fayoum governorate conditions. Fayoum J. Agric. Res &Dev., 20(2): 250.

Davis, M.P.; Rajion M.A.; Yasin, H.M.; Hamzah, R.; Djajanegara, A. and Sukmawati, A. (1994). Highly efficient sheep production and the Malaysian humid tropics. Sustainable animal production and The Environment. Proc. 7th EAAP Anim sci. Congress, Bali. Indonesia, 11-16 July, 1994. 2:547.

Duncan, D.B., (1955). Multiple range and multiple F- test. Biometrics, 11:1.

El-Badawi, A.Y. and Gado, H.M. (1997). Water requirement of growing local goats measured under two climatic thermal conditions. Egypt. J. Anim. Prod: 34:49.

El-Khashab, M. A. and. Abd EL-Rahman, A.R (2001). The responses of some parameters of thermoregulation, blood and In-vivo body composition in sheep and goats under EL-Fayoum summer climate. Fayoum J. Agric. Res& Dev., 15: 16.

Fekry, A.E. (1984). Changes in body composition parameters following biological treatments. Ph.D. Thesis, Faculty of Agric., Cairo university.

Habeeb, A.A., I. F. Marai and Kamal, T. H. (1992). Heat stress. In Farm Animals and the Environment, Edited by C. Phillips and D. Piggins, C.A.B. International UK p. 27: 47.

Hassanin. S.H.; Abdalla. E.B.; Kothy, E.A.; Abd-Elaziz, A.M.S. and El-Fouly, M.A. (1996). Efficiency of asbestos shading for growth of Barki rams during hot summer. Small Rumin. Res. 20:199.

Hatem. M.H. (1999). Environmental studies of some housing systems for sheep under Egyptian conditions. ASAE-CSAE-SCGR Annual International Meeting, Toronto, Ontario, Canada, 18-21 July. P:21.

IIiev, I., Kutsarov, G., Georgiev, I., Dechev, A., Gadiov, S., Konakchieva, R., Tomov, T. and Karamanos, P.A. (1998). The effect restricted mobility on plasma concentration of cortisol and some factors of non specific resistance in lambs. Zhivotnov dni- Nauki. 35:64.

Marai, I.F.M., Daader, A.H., Mekkawy, M.Y., Gabr, H.A. and Ibrahim, H. (1992). Effect of housing system, season of year and age on some physiological and hematological parameters and blood constituents of Ossimi sheep. J. Arid Environ. 22:277.

Mohr, E.G. and Wanek, K.Z.H. (1995). Endogenous oscillator and regulatory mechanisms of body temperature in sheep. Physiol. Beh., 57:339.

N.R.C. (1985). Nutrient requirements of sheep (6th ed,) National Academy Press, Washington, D.C.USA.

Nasholm, A. (1990). When should ewes be weighed. Fakta Sveriges Lantbruks universitet, Husdjur. 5:3.

Oser. B.I. (1979). Hawk's Physiological Chemistry Tata McGraw-Hill publ. Comp., Washington, D.C., USA.

Razzaque, M.A. and Ibnoaf, M.O.M. (1990). Responses of young and mature wethers exposed to micromist cooling in feedlot environments. J. Arid Environ., 19:341.

SPSS for windows, (1997). Statistical Package for Social Science. Release, 6.0 Copyright, SPSS. INC., Chicago, U.S.A.

Yousef, H.M., A.A. Habeeb and El-Kousey, H. (1997). Body weight gain and some physiological changes in Friesian calves protected with wood or reinforced concrete sheds during hot summer season of Egypt. J. Anim. Prod: 34:89.

تأثير ظروف المسكن على الأداء الانتاجى للأغنام في الصيف الحار في شمال صعيد مصر.

على ربيع عبد الرحمن و منى عبد التواب الخشاب
كلية الزراعة- جامعة الفيوم - مصر

تهدف هذه الدراسة إلى تقييم نظم الإيواء المناسبة للأغنام في الاراضى حديثة الاستصلاح في موسم الصيف في شمال صعيد مصر في منطقة الفيوم حيث أن مربى المجترات الصغيرة في هذه المنطقة يحتفظون بحيواناتهم في أحواش ذات مظلات أو أحواش بدون مظلات لهذا السبب استخدم في هذه الدراسة عشرة من حملان الاوسيمى النامية وحملان الصعيدي النامية في الفترة ما بين يونيو حتى سبتمبر حيث كانت متوسط درجت حرارة الجو ٢٨.٤ م°. تم تقسيم الحيوانات إلى مجموعتين حيث كل مجموعة ١٠ حيوانات تحتوى على خمسة من كل نوع وتم تربيتها ورعايتها في نظامين إيواء مختلفتين. التغيرات الفسيولوجية بالتحديد درجة حرارة المستقيم ومعدل التنفس واستهلاك مياه الشرب وعينات من الدم ودرجة حرارة الجو تم تقديرها في اليوم الأخير من كل ٣ أسابيع خلال فترة التجربة في الساعة ٧ صباحا والساعة الواحدة ظهرا والسادسة مساء كما أخذت عينات من الدم للحصول على السيرم لتقدير بروتينات السيرم كما تم تقدير مكونات الجسم معمليا في نهاية التجربة.

وكانت أهم النتائج من هذه الدراسة هي اختلاف معنوي واضح في معدل التنفس بين نوعى الأغنام ونتيجة الظروف البيئية في الاحواش بدون مظلات ومعدل التنفس في كلا النوعين والتي كانت متوسطاتها ٦٠.٦- ٦٣.٥ مرة بالدقيقة في نظام الاحواش بدون مظلة والاحواش ذات المظلات على التتابع.

يوجد ايضآ اختلاف معنوي بين النوعين فى معدل استهلاك المياه حيث كانت حملان الأغنام الصعيدي تستهلك كمية كبيرة من مياه الشرب عن حملان الاوسيمى فى كلا النوعين من الاحواش.

محتوى سيرم دم الحملان الاوسيمى من البروتين فى أول وثاني قياس الساعة ٧ صباحآ والواحدة ظهرا ٧.٥٥- ٧.٤٩ جرام % أعلى من محتوى دم حملان الصعيدي ٧.١٦-٧.٢٧ جرام % على التتابع بينما قياس الساعة ٦ مساء ٧.٣ جرام % اقل من محتوى دم الصعيدي والتي كانت ٧.٤٨ جرام %.

تشير النتائج إلى زيادة معنوية عند مستوى ٠.٠٥ في نسبة الماء والدهن والرماد في أجسام الحملان التي تم تنشئتها في أحواش ذات مظلات عن الحملان الأخرى التي تم تنشئتها في الاحواش غير المظللة. ايضآ الحملان في الاحواش المظللة كانت أثقل وزنا وأكثر في زيادة وزن الجسم وكذلك معدل الزيادة اليومية وتفوقت الحملان التي ربيت في الاحواش المظللة في كفاءة التحويل الغذائي. وازدادت أوزان الذبائح للحملان الصعيدية زيادة معنوية وكذلك صفات الذبيحة عن أوزان حملان الاوسيمى باستثناء الأعضاء المأكولة ونسبة التصافي.

ويمكن أن نستنتج من هذه الدراسة إن تنشئة حملان الصعيدي وكذلك الاوسيمى في الأحواش ذات المظلات أكثر جدوه اقتصادية عن التنشئة في النظام الأخر في الاحواش غير المظللة في شمال صعيد مصر أيضا كانت أغنام الصعيدي أفضل من الاوسيمى من الناحية الاقتصادية تحت ظروف هذه المنطقة.