

THERMAL RESPONSE OF SHEEP IN DIFFERENT DESIGNS OF ROOF HOUSING

By

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B.Sc. Agric. Sci. (Agricultural Engineering), Fac. Agric., Al Fateh Univ., 2005

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ABSTRACT

The number of sheep in Egypt was estimated in 2013 to be 5.45 million head. But it's decreased productivity in recent years due to the extremely high air temperature. This is considered one of the reasons leading to this. Therefore, to the protection of sheep and its increase productivity should be providing housing which achieving of the sheep engineering and environmental requirements.

This research was conducted to study the effect of roofing material type and height on thermal response and productive of sheep. Carried out An experiment at Agricultural Experimental Station, Fac. of Agric. Cairo univ., Giza, Egypt, on 30 Barki sheep (20 Ram and Ewe lambs, 10 yearling ewes). The two types of housing were tested .housing of concrete roofing, housing of iron sheet roofing. The measured indicators of houses: dimensions, orientation of houses, roofs, walls and floors temperature, climatic conditions (air temperature, relative humidity and air velocity) inside and outside housing. Then calculating of THI, conduction, convection and radiation heat transfer by using mathematical equations. Physiological parameters were measured: skin temperature, rectal temperature, wool temperature, respiration rate, body weight for sheep in summer and winter. Found that air temperature and relative humidity under iron sheet roofing (HB) were higher than under concrete roofing (HA) in summer while air temperature was higher in concrete roofing house (HA) than in iron sheet roofing house (HB) and relative humidity was lower in (HA) than (HB) in winter. Where the THI values were higher in HB compared with HA. This is due to the high thermal conductivity of iron sheet compared with reinforced concrete. Confirmed these results that mean of increasing in physiological parameters were higher in HB compared HA, and also mean body weights were generally higher in (HA) concrete roofing house than (HB) Iron sheet roofing house. As a conclusion The concrete roofed housing was protection provided from high temperature and relative humidity better than iron sheet roofed housing. Despite the iron sheet more height than reinforced concrete, but it did not provide a comfortable environment conditions for sheep. Where found that the environmental conditions under the roof of the concrete are better than under the roof of iron sheet.

Key words: Sheep, Housing, Roofing materials, Comfort Zone, Environmental control, Thermal conductivity, Thermal responses and productive.

DEDICATION

I dedicate this work to my parents and brothers for all the support they lovely offered during my post –graduate studies.

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CONTENTS

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	4
1. Animal housing.....	4
2. Environmental control in animals housing	18
3. Sheep responses to housing conditions.....	26
MATERIALS AND METHODS	33
RESULTS AND DISCUSSION	58
1. Effect of roof material types on thermal responses of sheep housing	58
a. Summer season.....	58
b. Winter season.....	63
2. Temperature-humidity Index.....	72
3. Heat balance for sheep houses	74
a. Conducting and convecting heat transfer for sheep houses	74
b. Heat radiation exchange between sheep surface and housing elements	84
4. Thermal responses of sheep	89
a. Respiration Rate.....	89
b. Rectal temperature	92
c. Skin temperature.....	99
d. Wool temperature.....	105
e. Productive performance	112
SUMMARY AND CONCLUSION	121
REFERENCES	124
APPENDICES	132

LIST OF TABLES

NO.	Title	Page
1.	Some properties of building materials.....	41
2.	Moisture production (MP), Sensible heat loss (SHL) and total heat loss (THL) of sheep based on calorimetric and housing systems studies.....	48
3.	Average of ambient temperature (AT, °C) and relative Humidity (RH %) at indoors of sheep houses (HA and HB) and outdoors during summer season at different day times.....	68
4.	Average of ambient temperature (AT, °C) and relative humidity (RH %) at indoors of sheep houses (HA and HB) and outdoors during winter season at different day times.....	68
5.	Average of temperature humidity index (THI) at indoors of sheep houses as affected by seasonal and diurnal variations.....	72
6.	Respiration rate (RR, resp./min) of Barki sheep as affected by different Factors during the whole experimental period (LSM±SE).....	89
7.	Rectal temperature (RT, °C) of Barki sheep as affected by different factors during the whole experimental period (LSM±SE).....	93
8.	Effect of housing types on rectal temperature (°C) of Barki ram lambs during seasonal and diurnal periods.....	95
9.	Effect of housing types on rectal temperature (°C) of Barki ewe lambs during seasonal and diurnal periods.....	96
10.	Effect of housing types on rectal temperature (°C) of Barki yearling ewes during seasonal and diurnal periods...	97
11.	Skin temperature (ST, °C) of Barki sheep as affected by different factors during the whole experimental period (LSM±SE).....	99
12.	Effect of housing types on skin temperature (°C) of Barki ram lambs during seasonal and diurnal periods.....	101
13.	Effect of housing types on skin temperature (°C) of Barki ewe lambs during seasonal and diurnal periods.....	102
14.	Effect of housing types on skin temperature (°C) of Barki yearling ewes during seasonal and diurnal periods.....	103

15	Wool temperature (WT, °C) of Barki sheep as affected by different factors during the whole experimental period (LSM±SE).....	106
16.	Effect of housing types on wool temperature (°C) of Barki ram lambs during seasonal and diurnal periods.....	108
17.	Effect of housing types on wool temperature (°C) of Barki ewe lambs during seasonal and diurnal periods.....	109
18.	Effect of housing types on wool temperature (°C) of Barki yearling ewes during seasonal and diurnal periods.....	110
19.	Body weight (BW, kg) of Barki sheep as affected by different factors during the whole experimental period (LSM±SE).....	113
20.	Physiological parameters of sheep as affected by THI values during the whole experimental period (LSM±SE)..	120