PRODUCTIVE AND REPRODUCTIVE RESPONSES OF GROWING SHAMI GOAT KIDS TO PROLONGED SALINE CONDITIONS IN SOUTH SINAI

BY

MOHARRAM FOUAD EL-BASSIONY

B.Sc. Agric. Sci. (Animal Production), Fac. Agric., Tanta Univ., 2000
M.Sc. Agric. Sci. (Animal Physiology), Fac. Agric., Cairo Univ., 2007

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

Agricultural Sciences

(Animal Physiology)

Department of Animal Production
Faculty of Agriculture
Cairo University
EGYPT

2013

APPROVAL SHEET

PRODUCTIVE AND REPRODUCTIVE RESPONSES OF GROWING SHAMI GOAT KIDS TO PROLONGED SALINE CONDITIONS IN SOUTH SINAI

Ph.D. Thesis
In
Agric. Sci. (Animal Physiology)

By

MOHARRAM FOUAD EL-BASSIONY

B.Sc. Agric. Sci. (Animal Production), Fac. Agric., Tanta Univ., 2000
M.Sc. Agric. Sci. (Animal Physiology), Fac. Agric., Cairo Univ., 2007

APPROVAL COMMITTEE

Dr. ESSMAT BAKRY ABDALLA ……..……
Professor of Animal Physiology, Fac. Agric., Ain Shams University

Dr. HAMDY MOHAMMED MOURAD ……
Professor of Animal Physiology, Fac. Agric., Cairo University

Dr. GAMAL ASHOUR HASSAN ……..……..……
Professor of Animal Physiology, Fac. Agric., Cairo University

Date: / /

SUPERVISION SHEET

PRODUCTIVE AND REPRODUCTIVE RESPONSES OF GROWING SHAMI GOAT KIDS TO PROLONGED SALINE CONDITIONS IN SOUTH SINAI

Ph.D. Thesis
In
Agric. Sci. (Animal Physiology)

By

MOHARRAM FOUAD EL-BASSIONY

B.Sc. Agric. Sci. (Animal Production), Fac. Agric., Tanta Univ., 2000
M.Sc. Agric. Sci. (Animal Physiology), Fac. Agric., Cairo Univ., 2007

SUPERVISION COMMITTEE

Dr. GAMAL ASHOUR HASSAN
Professor of Animal Physiology, Fac. Agric., Cairo University

Dr. YASSEIN MOHAMMED HAFEZ
Associate Professor of Animal Physiology, Fac. Agric., Cairo University

Dr. MOHAMMED TAREK ABDEL-FATTAH BADAWY
Researcher Professor of Animal Physiology, Desert Research Center

Name of Candidate: Moharram Fouad El-Bassiony **Degree:** Ph.D.
Title of Thesis: Productive and Reproductive Responses of Growing Shami Goat Kids to Prolonged Saline Conditions in South Sinai
Supervisors: Dr. Gamal Ashour Hassan
Dr. Yassein Mohammed Hafez
Dr. Mohammed Tarek Abdel-Fattah Badawy
Department: Animal Production **Branch:** Animal Physiology
Approval: 22 / 6 / 2013

ABSTRACT

This study was carried out at South Sinai Research Station (Ras Sudr), Desert Research Center, to evaluate and assess the impact of salinity on the productive and reproductive performance of growing Shami males from weaning to sexual maturity throughout one year. 28 growing Shami male kids (2.5 – 3.0 months old and 12.94±0.64 kg average live body weight) were randomly assigned into four equal groups (7 each). The 1st group (G1) was fed on berseem hay (BH) and drank tap water (TW) and served as control. The 2nd group (G2) was fed on BH and drank saline water (SW). The 3rd group (G3) was fed on salt-tolerant plants (SP, alfalfa) and drank TW and the 4th group (G4) was fed on SP and drank SW. Results indicated that growth performance was almost the same among all groups. Although, SW groups were higher than their counterparts, the highest drinking water intake was observed in G1 and G2, while the lowest values were observed in G3 and G4. Blood biochemical analysis indicated that SW groups had lower values of RBCs, Ht, MCH, MCHC, TP, Glb, A/G ratio, Glu, T_3, T, Ins and higher values of MCV, BUN, CR, AST, ALT, K, Cort while WBCs, Zn did not show any significant difference. Moreover, salinity even in feed or water tended to decrease Alb, TL, TC and increase Na, Ca, Mg, Cl, T_4, Ald than that found in G1 group. In G1 and G3 groups, Shami bucks reached sexual maturity at 171 and 177 day's old, respectively followed by G2 (186 day's old) while G4 was the most delayed in reaching the age of puberty (191 day's old). Semen quality, testicular and reproductive organs measurements were better ($P<0.05$) in the G1 followed by G3 bucks than those in the G2 and G4. It could be concluded that salinity condition indeed adversely affected most of the productive and reproductive traits of Shami male goats. However, these differences are within the normal values. The deleterious effect of salinity could be attributed mainly to drinking saline water. This obvious negative effect was alleviated by drinking tap water.

Keywords: Shami bucks; Saline water; Salt-tolerant plants; Growth; Blood picture; Metabolites; Hormones; Enzymes; Electrolyte; Puberty; Semen quality; Testicular measurements.

DEDICATION

I dedicate this work to whom my heartfelt thanks; to my beloved and reverent family my ***father, mother, brother*** *and* ***sisters*** *for all the support they lovely offered along the period of my post-graduation, to my lovely wife* ***Abeer*** *for endless support, help, understanding, encouragement and patience, to my precious son* ***Ahmed*** *and my beloved baby* ***Noran*** *for their love and patience.*

ACKNOWLEDGEMENT

Thanks to Allah, *The most gracious, beneficent and merciful for his induced blessing to achieve goals and make them possible and gave me the ability and patience to finish this work.*

I wish to express my deepest thanks, appreciation and gratitude to ***Dr. Gamal Ashour,*** *Professor of Animal Physiology, Faculty of Agriculture, Cairo University, for his kind and close supervision, enthusiasm, valuable suggestion, encouragement, keen follow up of the work, supported me in mastering any difficulties and great help in writing and preparation of the thesis.*

I have the honor to present special thanks and gratefulness are due to ***Dr. Mohammed Tarek Badawy,*** *Professor of Animal Physiology, Desert Research Center for his continuous supervision, providing facilities and kind help during the experimental work.*

I heartily wish to express my sincere thanks and deepest gratitude to ***Dr. Yassein Hafez,*** *Associate Professor of Animal Physiology, Faculty of Agriculture, Cairo University, for his supervision, valuable advises and writing of the thesis.*

Grateful appreciation is also extending to ***Dr. Hassan El-Shaer,*** *the coordinator of the joint project financed by Desert Research Center (DRC) in Egypt and the International Center for Biosaline Agriculture (ICBA) in UAE for the facilities they offered, indispensable instructions and help during the experimental work as this study is a part of the project.*

Deep thanks are due to ***Dr. Nagy Ibrahim, Dr. Ali Morsy, Dr. Ahmed El-Hawy, Dr. Salah Abo Bakr, Dr. Khamis Emam*** *and* ***Dr. Mohamed El-Rayes*** *for their kind help during the experimental work, support, encouragement and guidance in the statistical analysis of the results.*

Finally, deepest appreciation and sincere gratefulness are due to ***my family, my wife and my kids – Ahmed and Noran*** *– for their encouragement and moral support during all my life.*

LIST OF ABBREVIATIONS

A/G	**Albumin / globulin ratio**
ADG	**Average daily gain**
Alb	**Albumin**
Ald	**Aldosterone hormone**
ALT	**Alanine aminotransferase**
AMW	**Ampulla weight**
ASP	**Abnormal spermatozoa percentage**
AST	**Aspartate aminotransferase**
BH	**Berseem hay**
BUN	**Blood urea nitrogen**
BW	**Body weight**
Ca	**Calcium**
CFM	**Concentrate feed mixture**
CGW	**Cowper's gland weight**
Cl	**Chloride**
Cort	**Cortisol**
CR	**Creatinine**
dl	**Deciliter (10^{-2} liter)**
DMI	**Dry matter intake**
DW	**Drinking water**
EC	**Electric conductivity**
EPW	**Epididymis weight**
EV	**Ejaculate volume**
FC	**Feed conversion**
FI	**Feed intake**

g	**Gram (10^{-3} kilogram)**
Glb	**Globulin**
Glu	**Glucose**
Hb	**Hemoglobin concentration**
Ht	**Hematocrit value**
IFC	**Initial fructose concentration**
Ins	**Insulin**
IU	**International unit**
K	**Potassium**
l	**litter (10^{3} milliliter)**
LD	**Long diameter**
LSP	**Live spermatozoa percentage**
MCH	**Mean corpuscular hemoglobin**
MCHC	**Mean corpuscular hemoglobin concentration**
MCV	**Mean corpuscular volume**
mg	**Milligram (10^{-3} gram)**
Mg	**Magnesium**
ml	**Milliliter (10^{-3} liter)**
MM	**Mass motility**
mo	**Month(s)**
Na	**Sodium**
ng	**Nanogram (10^{-9} gram)**
P	**Phosphorus**
PCV	**Packed cell volume**
pg	**Picogram (10^{-12} gram)**
r	**Correlation coefficient**