REPRODUCTIVE AND PHYSIOLOGICAL PERFORMANCE OF MALE DROMEDARY CAMELS DURING BREEDING AND NON-BREEDING SEASONS

By

MAIADA WAGDY AHMED ALLAM

B.Sc. Agric. Sc. (Animal Production), Ain Shams University, 2005

A thesis submitted in partial fulfillment

of

the requirements for the degree of

MASTER OF SCIENCE

in

Agricultural Science (Animal Physiology)

Department of Animal Production

Faculty of Agriculture

Ain Shams University

2011

Approval Sheet

REPRODUCTIVE AND PHYSIOLOGICAL PERFORMANCE OF MALE DROMEDARY CAMELS DURING BREEDING AND NON-BREEDING SEASONS

By

MAIADA WAGDY AHMED ALLAM

B.Sc. Agric. Sc. (Animal Production), Ain Shams University, 2005

This thesis for M. Sc. degree has been approved by:

Dr. Gamal Ashour Hassan .....

Prof. of Animal Physiology, Faculty of Agriculture, Cairo University

Dr. Hanafy Embaby El-Sobhy .....

Prof. Emeritus of Animal Physiology, Faculty of Agriculture, Ain Shams University

Dr. Essmat Bakry Abdalla .....

Prof. of Animal Physiology, Faculty of Agriculture, Ain Shams University

Date of Examination: 4 / 4 / 2011

REPRODUCTIVE AND PHYSIOLOGICAL PERFORMANCE OF MALE DROMEDARY CAMELS DURING BREEDING AND NON-BREEDING SEASONS

By

MAIADA WAGDY AHMED ALLAM

B.Sc. Agric. Sc. (Animal Production), Ain Shams University, 2005

Under the supervision of:

Dr. Essmat Bakry Abdalla

Prof. of Animal Physiology, Department of Animal Production, Faculty of Agriculture, Ain Shams University (Principal Supervisor**)**

Dr. Alaa El-Sayed Bellasy Zeidan

Head of Research of Physiology of Reproduction and Artificial Insemination, Animal Production Research Institute, Agricultural Research Center

ABSTRACT

Maiada Wagdy Ahmed Allam: Reproductive and Physiological Performance of Male Dromedary Camels during Breeding and Non-breeding Seasons. Unpublished M.Sc. Thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2011.

Two experiments were carried out. The first experiment aimed to investigate the effects of breeding (December till April) and non-breeding (May till November) seasons either hot-humid (May till July) or hot-dry (August till November) months of the male dromedary camels on body thermoregulation, testicular measurements, epididymal semen characteristics, blood haematology and blood serum components. The histological changes in the right and left testes were also observed. The second experiment, aimed to define the effects of breeding and non-breeding seasons on epididymal semen quality and enzymatic activities, during storage at 5 °C for up to 3 days.

The obtained results showed that, rectal temperature (RT), respiration rate (RR) and pulse rate (PR) were significantly ($P<0.05$) lower, while testis weight, testicular volume, scrotal circumference and testis tone firmer score of the dromedary camels were significantly ($P<0.05$) higher during breeding season as compared to non-breeding season either hot-dry or hot-humid months. Semen colour of the dromedary camels were creamish white, milky white and watery white during breeding season, hot-dry and hot-humid months, respectively. Semen consistency of the dromedary camels was viscous during breeding season and hot-dry months, semi-viscous during hot-humid months. The percentage of sperm motility and the sperm-cell concentration were significantly ($P<0.05$) higher during breeding season as compared to both hot-dry and hot-humid months.

Seminal pH was significantly ($P<0.05$) higher during hot-humid months as compared to breeding season and hot-dry months. The

percentages of dead spermatozoa, sperm abnormalities and acrosomal damage of spermatozoa increased significantly ($P<0.05$) in hot-humid months as compared to both hot-dry months and breeding season. Haemoglobin (Hb) and haematocrit (Ht) were significantly ($P<0.05$) higher during non-breeding season either hot-humid or hot-dry months than breeding season. Red blood cells (RBC's) count was significantly ($P<0.05$) higher, while white blood cells (WBC's) count was significantly ($P<0.05$) lower during non-breeding season at hot-humid months than hot-dry months and breeding season. Total proteins, sodium concentrations, alkaline phosphatase (ALP), alanine-aminotrasferase (ALT) and aspartate-aminotransferase (AST) enzymes were significantly ($P<0.05$) higher, while albumin and globulin concentrations were insignificantly increased in the non-breeding season at hot-humid months as compared with hot-dry months and breeding season. Cholesterol, urea-nitrogen, potassium, calcium, total phosphorus concentrations and testosterone hormone increased significantly ($P<0.05$), while creatinine concentration in blood serum decreased significantly ($P<0.05$) during breeding season as compared with non-breeding season in hot-dry and hot-humid months. The testes examination revealed that more active during breeding season especially in the left testes than the non-breeding season either hot-dry and hot-humid months (Experiment 1).

The percentage of sperm motility and storagability of spermatozoa were significantly ($P<0.05$) higher, while the percentages of dead spermatozoa, sperm abnormalities, acrosomal damage of spermatozoa and the amount of ALT and AST enzymes were significantly ($P<0.05$) lower during breeding season than non-breeding season either hot-dry or hot-humid months. The percentages of dead spermatozoa, sperm abnormalities and acrosomal damage of spermatozoa were significantly ($P<0.05$) higher during hot-humid months than hot-dry months and breeding season. The activities of ALT and AST enzymes of the dromedary camels semen were insignificantly higher during non-breeding season in hot-humid months than hot-dry season. The percentage of sperm

motility was significantly (P<0.05) higher, while the percentages of dead spermatozoa, sperm abnormalities, acrosomal damage of spermatozoa and the amount of ALT and AST enzymes were significantly (P<0.05) lower during storage at 5°C for 3 days. There was no significant difference on the percentage of acrosomal damage of spermatozoa, ALT and AST activities between hot-humid and hot-dry seasons at storage at 5°C for up to 1 day. The prolongation of storage at 5°C for up to 3 days significantly (P<0.05) decreased the percentage of sperm motility, while significantly (P<0.05) increased the percentages of dead spermatozoa, sperm abnormalities, acrosomal damage of spermatozoa and the amount of ALT and AST activities of the dromedary camels during breeding and non-breeding seasons. The penetrating ability of spermatozoa into she-camel cervical mucus was significantly (P<0.05) better during breeding season than non-breeding season in hot-humid months and insignificantly (P<0.05) better during hot-dry months. While, the penetrating score was significantly (P<0.05) decreased during breeding and non-breeding seasons either hot-humid or hot-dry months with the advancement time of incubation at 37°C for 4 hours (Experiment 2).

Key Words:

Male camel, breeding season, thermoregulation, testes, semen, blood, biochemistry, penetration, storage

ACKNOWLEDGEMENT

In actual fact the prayerful thanks are due to our **MERCIFUL ALLAH** who gave me the ability and patience to finish this work.

Special acknowledgement and sincere appreciation to **Dr. Essmat Bakry Abdalla,** Professor of Animal Physiology, Department of Animal Production, Faculty of Agriculture, Ain Shams University, for his sharing in suggesting the subject of this study, close supervision, constructive criticism, valuable advices and great help in preparation of the manuscript.

Hearty thanks and gratitude are due to **Dr. Alaa El-Sayed Bellasy Zeidan,** Head of Research of Physiology of Reproduction and Artificial Insemination, Animal Production Research Institute, Agricultural Research Center, for his direct and excellent supervision, appreciable help, great interest, sharing in suggesting the problem, revision the manuscript, valuable guidance and encouragement throughout the different phases of this work and help during the writing of this manuscript.

Deep thanks and special gratitude extended to **Dr. Abd El-Salaam El-Azab,** Professor of Theriogenology, Faculty of Veterinary Medicine, Benha University and **Dr. Hossam Fouad,** Assistant Professor of Histology, Department of Animal Histology, Faculty of Veterinary Medicine, Benha University, for their kind help in histological studies in this work.

Special thanks and deep gratitude extended to **Dr. Atef Mahrous Abd El-Salaam Hassan,** Researcher of Animal Physiology, Animal Production Research Institute, Agricultural Research Center, for his kind help in the experimental work.

Special thanks and deep gratitude extended to **Dr. Assam Abdo,** Lecturer of Animal Physiology, Department of Animal Production, Faculty of Agriculture, Ain Shams University, for his kind help in blood haematology.

Special thanks and deep gratitude extended to **Dr. Ahmed Hafez,** for his kind help in biochemical analysis.

Special thanks and deep gratitude extended to **Staff Members** in the Slaughterhouse in Belbies City for their kind help in the experimental work.

Special thanks and deep gratitude extended to **Staff Members** of the Department of Animal Production, Faculty of Agriculture, Ain Shams University, for their help during this work.

Last but not least, hearty thanks and gratitude for **my lovely Mother and my lovely Father, my dear Sister, and my dear Brothers,** for their encouragement throughout the different periods of this work.

CONTENTS

LIST OF TABLES