APPLICATION OF ARTIFICIAL INSEMINATION TECHNOLOGY FOR MULE DUCKS PRODUCTION

By

MOHAMED GAMAL MOHAMED SALLAM

B.Sc. Agric. Sc. (Poultry Production), Cairo University, 2007

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

Dr. Zenat Abdel-Gawad Ibrahim.....……..…….
Prof. of Poultry Physiology, Faculty of Agriculture, Zagazig University

Dr. Ayman Mohamed Hassan……..……
Associate Prof. of Poultry Physiology, Faculty of Agriculture, Ain Shams University

Dr. Sayed Ahmed Abdel-Fattah ……...……...……
Associate Prof. of Poultry Physiology, Faculty of Agriculture, Ain Shams University

Dr. Ibrahim El-Wardany El-Sayed.…….....….....…….
Prof. Emeritus of Poultry Physiology, Faculty of Agriculture, Ain Shams University

Date of Examination: 11/ 11 / 2013

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MOHAMED GAMAL MOHAMED SALLAM

B.Sc. Agric. Sc. (Poultry Production), Cairo University, 2007

Under the supervision of:

Dr. Ibrahim El- Wardany El- Sayed

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

Dr. Sayed Ahmed Abdel-Fattah

Associate Prof. of Poultry Physiology, Department of Poultry Production, Faculty of Agriculture, Ain Shams University

Dr. Faisal Bayoumi Abdel- Salam

Lecturer of Poultry Physiology, Department of Poultry Production, Faculty of Agriculture, Ain Shams University

ABSTRACT

Mohamed Gamal Mohamed Sallam: Application of Artificial Insemination Technology for Mule Ducks Production. Unpublished M.Sc. Thesis, Department of Poultry Production, Faculty of Agriculture, Ain Shams University, 2013.

A total of 40 Muscovy drakes were chosen for the subsequent procedures (10 drakes / treatment), to investigate the effect of some dietary vitamins. Semen evaluation tests included: volume (ml), progressive motility, concentration, dead sperms and abnormal spermatozoa percentage. Five extenders were used (two new proposed semen extenders ASUE-A and ASUE-B which compared with three other standard semen extenders A, B and C), to improve fertilizing capacity of semen samples under three different storage periods. This may have a positive impact on Mule ducks production as the main objective of this study. Artificial insemination technology was applied to test fertility and hatchability. Results indicated that the supplemented groups had significantly higher semen volume, concentration and lower total sperm abnormalities (%) and clumping of sperms than the control group. Drakes of dietary supplementations had higher plasma thyroid hormones and Testosterone concentrations. There were significant differences between different groups in plasma FSH, LH and IGF-1 hormones levels. Highly significant differences between groups in plasma Alkaline Phosphatase and Cholesterol values. However insignificant differences between groups in plasma acid phosphatase, ALT, total protein, albumin and globulin levels were recorded. Significant differences between the experimental

groups in seminal plasma acid phosphatase, ALT, AST, cholesterol and total protein values. The fertility (%) was higher by using semen samples diluted with E, B and D extenders, for different storage periods (6-24 h). It is concluded that dietary vit. C or vit. E + Se could be used with the Ain Shams University semen extender (ASUE-B) under a storage period (6h) without any deleterious impact on semen quality traits, fertility and hatchability percentages of Mule-producing eggs.

Keywords: Artificial insemination, semen extenders, vitamins, semen quality, Muscovy drakes, fertility and hatchability.

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LIST OF ABBREVIATIONS

%	:	Percent
°C	:	The degree Celsius
°F	:	The degree Fahrenheit
µL	:	Micro liter
ACP	:	Acid Phosphatase
AI	:	Artificial Insemination
ALP	:	Alkaline Phosphatase
ALT	:	Alanine aminotransferase
AST	:	Aspartate aminotransferase
ASUE-A	:	Ain Shams University Extender-A
ASUE-B	:	Ain Shams University Extender-B
cm	:	Centimeter
Con	:	Concentration
CP	:	Crude Protein
d	:	Day
dl	:	Deciliter
DOA	:	Day of age
DS	:	Dead Sperm
FSH	:	Follicles Stimulating Hormone
g	:	Gram
GLM	:	General Linear Models
h	:	Hour
IGF-1	:	Insulin-like Growth Factors
IU	:	International unit
Kcal	:	Kilo calorie
kDa	:	Kilo Dalton
Kg	:	Kilo gram
LH	:	Luteinizing Hormone

ME	:	Metabolizabole energy
mg	:	Mille gram
min	:	Minute
min	:	Minutes
ml	:	Milliliter
NaCl	:	Sodium Chloride
NAUE	:	Nanjing Agric. Univ. Extender
ng	:	Nanogram
P	:	Probability
pH	:	Hydrogen ion concentration
PM	:	Progressive Motility
ppm	:	Part per million
PTP	:	Plasma Total Proteins
RBCs	:	Red blood cells
RIA	:	Radio-immune-assay
rpm	:	Revolution per minute
SST's	:	Sperm Storage Tubules
T_3	:	Triiodothyronine
T_4	:	Thyroxine
U	:	Unit
v	:	Volume
vit. A	:	Vitamin A
vit. C	:	Vitamin C
vit. E+SE	:	Vitamin E + Selenium
WOA	:	Week of age

INTRODUCTION

Mule duck production is one of the poultry production branches which contribute in supplying good quality meat for human consumption.

Ducks are reared commercially in relatively large farms where Muscovy, Pekin, Campbell, Sudani and local strains were the main water fowl species in Egypt. There is a considerable increase in Mule ducks production due to its faster growth rate, better feed conversion and desirable type of meat for many consumers.

Mule ducks are produced by intergeneric crossbreeding (hybridization) between common ducks females with Muscovy drakes **(Ola, 2000)**. The major problem that retarded the progress in Mule duck production is the low fertility and hatchability percentages.

Although the application of artificial insemination techniques (AI) has markedly increased the crossbreeding fertility compared to natural mating **(Huang and Chow, 1974; Pingel and Wanger, 1995)**; fertility levels still remain lower in hybridised eggs.

Another problem is the use of semen extenders with suitable ingredients to supply the energy demands of spermatozoa and to preserve their fertilizing ability. This was reported as a guarantee for obtaining high fertility by AI of ducks **(Atanasov, *et al.*, 2007)**.

Moreover, the duration of fertility and the percentages of early, mid and late embryonic mortality in the intergeneric crossbreeding were also reported by **Burn, *et al.* (2008).**

Dietary supplementation with some vitamins was reported to improve semen quality traits in males from different avian species **(Suari, *et al*,. 1998; Haboby, *et al.*, 2004 and Jerysz and Lukaszwicz, 2013).**

There are few publications addressing the issue of reproductive efficiency in ducks. However, it is apparent that any improvement in the

drake's fertilizing ability would have a positive impact on Mule duck production.

Therefore, the main objectives of the present study were:

1. To determine the effect of dietary supplementation with vitamin E+Se, vitamin C or vitamin A on semen quality traits of Muscovy drakes.
2. To assess the effect of two new created semen extenders on semen quality and fertility.
3. To study the effect of different storage periods at 5°C on semen quality traits.
4. To determine fertility and hatchability percentages of artificially inseminated Pekin ducks with Muscovy semen – diluted with some extenders.
5. To determine the relationship among some blood plasma hormones, enzymes with seminal plasma constituents related to semen quality, fertility and hatchability traits.
6. To establish the influence of three foreign extenders and two newly created and proposed (ASUE-A, B) extenders on semen quality traits and some seminal plasma biochemical parameters in cold – stored (5°C) Muscovy semen.