A STUDY OF SOME GENETICAL AND ENVIRONMENTAL FACTORS AFFECTING PERFORMANCE OF LAYING HENS AND THEIR CROSSES

By
ESAM FOUAD ABD EL-HAMIED

A thesis submitted in partial fulfillment

of

the requirements for the degree of

DOCTOR OF PHILOSOPH

in

Agricultural Science

(Poultry Breeding

E. f

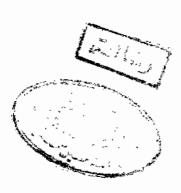
4978°

Poultry Production Department

Faculty of Agriculture

Ain Shams University

1993



A STUDY OF SOME GENETICAL AND ENVIRONMENTAL FACTORS AFFECTING PERFORMANCE OF LAYING HENS

AND THEIR CROSSES

Βv

ESAM FOUAD ABD EL-HAMIED

B.Sc. Agric. Sci. (Animal Production) Ain-Shams Univ. 1981

M.Sc. Agric. Sci. (Poultry Breeding) Ain-Shams Univ. 1988

Under the supervision of:

Prof. Dr. M.F. Amer Professor of Poultry Breeding Poultry production Department Faculty of Agriculture Ain Shams University

Prof. Dr. M.A. El-Zeiny Professor of Poultry Nutrition Poultry production Department Faculty of Agriculture Ain Shams University

Prof. Dr. Y.M. Abd El-kader Professor of Poultry Breeding Poultry production Department Animal Production Research Institute Agriculture Research Center Ministry of Agriculture

ABSTRACT

The present study was designed to evaluate some economical traits and to estimate some genetical traits for purebred and crossbred progenies under three different systems of feeding. The results showed superiority of crosses compared with the purebred chicks in body weight and egg production. Also, feed restriction increased egg number and egg weight. Egg components although were affected due to genetic groups, yet feed restricted had no effect.

(Key Words: Crossbreeding, feed restriction, laying hens)



Approval Sheet

A STUDY OF SOME GENETICAL AND ENVIRONMENTAL FACTORS AFFECTING PERFORMANCE OF LAYING HENS

AND THEIR CROSSES

Ву

ESAM FOUAD ABD EL-HAMIED

B.Sc. Agric. Sci. (Animal Production) Ain-Shams University, 1981

M.Sc. Agric. Sci. (Poultry Breeding) Ain-Shams University, 1988

This thesis for Ph.D. degree has been approved by:

Prof. Dr. F. Hassan Abdou F. H. Aldam

Prof. of Poultry Breeding, Monoufia University.

Prof. Dr. M. Soliman Khatab Mis. Kumilo

Prof. of Poultry Breeding, Suez Canal University.

Prof. Dr. M. Fikry Amer

Prof. of Poultry Breeding, Ain Shams University.

Date of examination: 3 // /1993.

ACKNOWLEDGMENTS

The author wishes to express his deep sincere appreciation and gratitude to Professor Dr. M.F. Amer, Professor of poultry breeding in the Poultry Production Department, Faculty of Agriculture, Ain Shams University, who suggested the problem, supervision and keen interest during the experiment. To Professor Dr. M. El-Zeiny, Professor of Poultry Nutrition in the Poultry Production, Faculty of Agriculture, Ain Shams University for his close supervision, constructive criticism, encouragement and revising the manuscript entire investigation. Without their help, the time they spent and interest they have shown, statistical analysis and the progress of the work would have never been completed.

Special thanks are directed to Dr. Y.M. Abd El-Kader. Professor of Poultry Breeding, Animal Production Research Institute, for his close supervision, his help and providing facilities required for this study.

My deepest thanks to Dr. K. Shahin, assistant Professor of Animal Breeding, for her help in solving statistical analysis problems.

My deepest thanks to the staff of the Poultry Production Department for their help throughout this work.

To my colleagues, the staff of the experimental station, Barrage, I am greatly indebted for their help

throughout this work.

Finally, I also wish to express my deeply gratitude to my wife and my daughter for their help and continuous encouragement. Without their help, I could not complete this study.

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
II.	REVIEW OF LITERATURE	3
	The influence of the main factors. 1. Body weight	3 3 3 5 7 7 7 9
	3.1. Influence of crossing. 3.2. Influence of feed restriction. 4. Egg quality	9 12 12 15 17 17 18 18 18
III.	MATERIALS AND METHODS	20
	 Location and experimental period Experiment birds Experiment design of feeding The measurement characters Statistical analysis 	20 20 21 22 25
IV.	RESULTS AND DISCUSSION	29
	The influence of the main factors. 1. Live Body weight. 1.1. Influence of crossing. 1.2. Influence of feed restriction. 2. Rate of growth. 2.1. Influence of crossing. 2.2. Influence of feed restriction. 3. Feed consumption. 3.1. Influence of crossing. 3.2. Influence of feed restriction. 4. Age at sexual maturity.	29 29 29 31 48 48 49 61 61
	4.1. Influence of crossing	68 68

	rage
5. Egg production	73
5.1. Egg number	73
5.1.1. Influence of crossing	73
5.1.2. Influence of feed restriction	74
5.2. Egg weight	76
5.2.1. Influence of crossing	76
5.2.2. Influence of feed restriction	76
6. Egg quality	87
6.1. Egg shape index	87
6.1.1. Influence of crossing	87
6.1.2. Influence of feed restriction	89
6.2. Shell	88
6.2.1. Influence of crossing	88
6.2.2. Influence of feed restriction	89
6.3. Albumen	90
'6.3.1. Influence of crossing	90
6.3.2. Influence of feed restriction	92
6.4. Yolk	93
6.4.1. Influence of crossing	9.3
6.4.2. Influence of feed restriction	94
6.5. Haugh Unit	95
6.4.1. Influence of crossing	95
6.4.2. Influence of feed restriction	95
7. Viability	103
1.1. Influence of crossing	103
1.2. Influence of feed restriction	104
8. Breed of sire and dam	109
8.1. Live Body weight	109
8.1.1. Breed of sire	109
8.1.2. Breed of dam	109
8.1.3. Breed of sire and dam interaction	110
B.2. Feed consumption	115
8.2.1. Breed of sire	115
8.2.2. Breed of dam	115
8.2.3. Breed of sire and dam interaction	115
8.3. Age at sexual maturity	119
8.3.1. Breed of sire	119
8.3.2. Breed of dam	119
8.3.3. Breed of sire and dam interaction	119
8.4. Egg production	119
8.4.1. Breed of sire	120
8.4.2. Breed of dam	120
8.4.3. Breed of sire and dam interaction	120
8.5. Egg quality	127
8.5.1. Breed of sire	127
8.5.2. Breed of dam	128
8.5.3. Breed of sire and dam interaction	129
9. Phenotypic correlations	136
9.1. Correlation among body weight	136
9.2. Correlation among feed consumption.	
age at sexual maturity, age at 20%	
OF BOO BLOODERION BOOK BANDOR BAND	

		rage
	egg weight	
v .	SUMMARY AND CONCLUSIONS	148
VI.	REFERENCES	152
VII.	ARABIC SUMMARY	

LIST OF TABLES

Table		Page
1.	Symbols and their description	
2.	Starter, grower and layer ration nutritive and chemical values	22
Э.	Means (g) of body weights in different breeds at different ages	37
4.	Least-squares means (g) of body weight in sexes at different ages	41
5.	Least-squares means (g) of body weight in different breed groups at different ages	42
6.	Least-squares means (g) of body weight in different treatments at different ages	43
7.	Least-squares analysis of variance for body weight at different ages	44
8.	Percent of beterosis in different ages of different treatments	46
9,	Rate of growth of body weight at different ages	53
10.	Least-squares mean of feed consumption at different ages for breeds and crosses	63
11.	Least-squares mean of feed consumption at different ages for different treatments.	64
12.	Least-squares analysis of variance for feed consumption at different ages	65
13.	Age at sexual maturity and at 20% production in days	70
14.	Least-squares analysis of variance at sexual maturity and 20% production	71
15.	Least-squares mean of egg number and egg weight at 3, 6, 9, 12 month after sexual maturity for the purebred and	79

29.	dam and treatments for age at first egg, 20% production, egg number and egg weight at 1-12 month after production	122
30.	Least-squares analysis of variance of breed of sire, dam and treatment for age at first egg, 20% production, egg number and egg weight at 3, 6, 9, 12 month after sexual maturity	125
31.	Least-squares analysis of variance of breed ofsire and dam for age at first egg. 20% production, average egg number and egg weight at 3, 6, 9, 12 month after production	126
32.	Least-squares means (gm.) of breed of sire, dam, and treatment for different egg components	130
33.	Least-squares analysis of variance for breed of sire, dam, and treatment for egg components	132
34.	Least-squares analysis of variance for breed of sire and dam for egg components.	134
35.	Correlation among body weight at different ages	137
36.	Correlation among feed consumption, age at first egg, age at 20% of production, average egg number and egg weight at 3, 6, 9, 12 month of production	141
97	Correlation between and components	146

LIST OF FIGURES.

Figure	
 Effect of feed restriction on growth rate at different age intervals for Gimmizah females 	57
 Effect of feed restriction on growth rate at different age intervals for New Hampshire females 	58
 Effect of feed restriction on growth rate at different age intervals for GM X NH crosses females. 	59
4. Effect of feed restriction on growth rate at different age intervals for NH X GM crosses females	60
 Feed consumption for different genetical groups at different ages	66
6. Feed consumption for different treatments at different ages	67
7. Age at sexual maturity and at 20% production for different treatments	72
8. Egg number for different genetical groups at different ages after sexual maturity	83
 Egg weight for different genetical groups at different ages after sexual maturity 	84
10. Egg number for different treatments at different treatments at different ages after sexual maturity	85
11. Egg weight for different treatments at different treatments at different ages after	0.6

#