

EFFECT OF SOME ENVIRONMENTAL CONDITIONS
ON HERITABILITY AND SOME OTHER GENETIC - PARAMETERS
IN CHICKENS

BY

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INTRODUCTION

Selection of various traits effectiveness has been proved to be dependent on some environmental conditions, such as length of light, date of hatching and level of nutrition.

For broiler production, excess of light regime or continuous light system has been largely applied by poultry breeders. Under Egyptian conditions, it is greatly needed to carry out further investigations to study the effect of excess light on the different performance of chicks as well as the genetic - variations.

Heritability estimates and predicted response to selection have been reported to be changable according to such treatments. From practical point of view, that may be useful in selecting a program based on individual performances which is a common practical in most of our Poultry Organisations.

The present investigation therefore designed to study the effect of season and continuous light regime on

different performances:

body weight at early period of growth, keel length, shank length and body depth.

The magnitude of heritabilities under this environmental conditions were also estimated as well as the relative expected response to selection. Moreover, correlations were calculated between the previous parameters under the two systems of light in order to find out their effect on the selection program.

REVIEW OF LITERATURE

I - Heritability estimates of body weight

The heritability of a metric character is one of the most important properties. Lerner (1950) demonstrated that, the importance of the value of h^2 rests on its properties as a measurement of the accuracy with which a genotype can be identified from the phenotype of an individual or of a group of individuals.

Lush (1940) defined heritability as that fraction of the observed variation which is caused by differences in heredity. He also differentiated between heritability in the broad and narrow sense. Falconer (1960) defined heritability as the ratio of additive genetic variance to phenotypic variance. He also mentioned that an equivalent meaning of the heritability is the regression of breeding value on phenotypic value.

Sex linked genes play an important part in heritability estimates. Thomas et al (1958) stated that heritability from the dam component of variance should be

highest when estimated for male progeny since the dam is assumed to contribute no sex - linked genes to female offspring.

Many workers estimated the heritability of body weights at different ages in chickens. Tables 1, 2, 3, 4, 5, 6 and 7 summarizes heritability estimates at hatch, 2, 4, 6, 8, 10 and 12 weeks of age respectively. It can be noticed that the higher average estimates from the maternal half sibs correlation as opposed to paternal half sibs correlation for body weight indicates the maternal effects. These estimates are ranged from - 0.31 to 2.46 as reported by Ezzeldin (1970).

Table (1) : Reported Heritability Estimates of Body Weight At-Hatching.

Breed	Sex	Heritability-Estimates		d.f.		Authors
		S	D	S	d	
W.L.	-	0.54±0.05				Gupta and Johra(1975)
W.L.(line GE)	-			0.63	20	Vanchev et al (1974)
Leghorn	-	0.46	1.28	0.87		Abdel-Gawad and El Ibiary (1971)
Fayoumi	-	0.10	1.48	0.79		Abdel-Gawad and El-Ibiary (1971)
"	males	0.01	1.82	0.91		Ezzeldin (1970)
"	females	0.09	1.63	0.86		"
"	both	0.08	1.69	0.88		"
"	-	0.26	0.46	0.36	70	Amer (1965)
R I R	-	-0.04	1.53	0.77	532	Abdel-Gawad and El-Ibiary (1971)
"	males	-0.31	2.46	1.07		Ezzeldin (1970)
"	females	0.06	2.15	1.11		"
"	both	-0.08	2.25	1.09		"
Average	-	0.11	1.68	0.85	-	

Table (2) : Reported Heritability Estimates of Body Weight at (2) Weeks of Age.

Breed	Sex	Heritability-Estimates			d.f.	Authors
		S	D	S+D	s	d
W. L.	-	0.51 $\pm$ 0.05				Gupta and Johra (1975)
"	Females	0.29				Taylor et al (1973)
N. H.	males	0.05		0.40	8	66 Kinney (1969)
"	Females	0.01		0.44	8	66 "
Average	-	0.22	-	0.42	-	-

Table (3) : Reported Heritability Estimates of Body Weight At (4) Weeks of Age.

For Males

Breed	Sex	Heritability-Estimates		d.f.		Authors
		S	D	S+D	s d	
Fayoumi (GG)	Males	0.93	0.20	0.56		Abdel-Wares (1976)
"	"	0.18	1.81	1.05		"
"	"	0.50	0.36	0.44		"
"	"	-0.16	0.45	0.14		"
Fayoumi	"	0.44	1.16	0.80		Abdel-Gawad and El-Ibiary (1971)
Fayoumi	"	0.260	0.669	0.464		El-Hossari (1970)
Fayoumi	"	0.12	0.44	0.28		Ezzeldin (1970)
R I R	"	0.13	0.32	0.22		"
Different breeds	"	0.43	0.61	0.45		Kinney (1969)
average	-	0.31	0.67	0.49	-	-

Table (3) Cont.: Reported Heritability Estimates of Body Weight At 42 Weeks of Age.
For Females

Breed	Sex	Heritability-Estimates		d.f.		Authors
		S	D	S+D	s d	
Fayoumi (GG)	Females	0.27	0.32	0.30		Abdel-Wares (1976)
" (PP)	"	0.34	0.66	0.50		"
" (GP)	"	-0.12	1.07	0.47		"
" (PG)	"	0.04	0.17	0.11		"
Fayoumi	"	-0.06	0.82	0.38		Abdel-Gawad and El-Ibiary (1971)
Fayoumi	"	0.334	0.559	0.447		El-Hossari (1970)
Fayoumi	"	0.01	0.51	0.26		Ezzeldin (1970)
P I R	"	0.08	0.44	0.26		"
W L	"	0.57				Taylor et al (1973)
Parent breeds	"	0.31	0.95	0.50		Kinney (1969)
MO	-	0.18	0.61	0.36		

Table (3) Cont.: Reported Heritability Estimates of Body Weight At (4) Weeks of Age.

For Both Sexes						
Breed	Sex	Heritability-Estimates		d.f.		Authors
		S	D	S+D	s d	
W L	Both	0.45 ⁺ .04				Gupta and Johra (1975)
K I R	both	0.50	0.22	0.36		El-Issawy et.al.(1975)
R I R Cross	"	0.44	0.24	0.34		"
Dandarawy	"	0.13	0.85	0.49		"
" Cross	"	0.00	0.14	0.07		"
Fayoumi	both	-0.01	1.70	0.85		Abdel-Gawad and El-Ibiary (1971)
Fayoumi	"	0.41	0.37	0.39		El-Hossari (1970a)
Fayoumi	"	0.06	0.50	0.28		"
Fayoumi	"	0.48	0.69	0.54		Amer (1965)

Average 0.273 0.589 0.415 - -

Table (4) : Reported Heritability Estimates of Body Weight At (6) Weeks of Age.

Breed	Sex	Heritability-Estimates		d.f.		Authors
		S	D	S	d	
Fayoumi	meles	0.33	1.01	0.67		Abdel-Gawad and El-Ibiary (1971)
R I R	"	0.27	0.14	0.21		" "
Different breeds	"	0.30	0.81	0.53		Kinney (1969)
Average	-	0.3	0.65	0.47	-	
Fayoumi	Females	-0.03	0.33	0.15		Abdel-Gawad and El-Ibiary (1971)
PIR	"	0.01	0.29	0.15		" "
Different breeds	"	0.38	0.78	0.48		Kinney (1969)
Average	-	0.12	0.47	0.26	-	
Fayoumi	both	0.03	1.32	0.67		Abdel-Gawad and El-Ibiary (1971)
RIR	"	-0.05	1.57	0.76		" "
W.L.	"	0.51±0.05				Gupta and Johra(1975)
Parent breeds	"	0.46	0.85	0.29		Kinney (1969)
Average	-	0.24	1.25	0.57	-	