

NATURAL MOLTING IN FAYOUMI FOWL
1- A STUDY OF FEATHERING AND ITS
RELATIONSHIP TO BODY WEIGHT IN TWO LINES OF
FAYOUMI FOWL

By

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Abstract: *Six hundred and thirty two, day-old unsexed, Fayoumi chicks, hatched late April, were used in this experiment; 305 chicks from an egg production line (PP), and 327 chicks from a growth line (GG). The PP line was selected for higher egg number, while the GG line was selected for heavier body weight at 8 weeks of age. The results indicated that feathering of both Fayoumi lines were rapid. The primary feathers of the PP females were faster growing than the GG females, at hatch. the GG males were faster feathering than the PP males at the same age. Females Secondary feathers, for both the PP and GG lines, were longer than that of the males at hatch. The (12) tail feathers, at 10 days of age were higher in the PP males and females than the GG. On the other hand, higher percentage of females, had (12) tail feathers, than males in both lines. The percentage of fully feathered GG line, males and females, were higher than those of the PP line at 8 weeks of age. While higher percentage of both PP and GG females were fully feathered at eight weeks of age (COV8) than the PP and GG males .*

Absolute body weight of the GG males and females were heavier than the PP males and females at 4 wk, 8 wk and from (0-8) weeks . Also, relative growth rate of the PP and GG males were faster than the PP and GG females for all the periods

Significant positive phenotypic correlation coefficients between body weight at hatch and each of : number of tail feathers at ten days, body weight at four weeks and body weight at eight weeks; between body weight at four weeks and each of : secondary feathers number at eight weeks, cover feathers index at eight weeks and body weight at eight weeks of age;

between body weight at eight weeks and each of : secondary feathers number at eight weeks and cover feathers index at eight weeks of age.

The length of the secondary feathers was negatively related, with the body weight of the PP line at hatch, at four weeks and eight weeks of age. However it was positively related, in the GG line at the same ages.

INTRODUCTION

A selection plan consisted of the selection of chicks for fast feathering, as shown by the number and size of the wing and tail feathers was applied (**El-Hossari, 1970**). Later selection was applied for efficient and rapid growth and for superior meat production. Selection on these basis, resulted in an improvement in the quality of broilers or fryers produced by such a flock of breeders. The selection was applied to both males and females. Rate of feathering can be determined, in day-old chicks, by the length of the primary and secondary feather sheaths of the wing and the number of the secondary feather sheaths. The chick with the highest feathering rate have well-developed primaries and secondaries, with six or more secondaries present at hatch. The tail development, at 10 days of age, is usually more in the best-feathering birds. Cover feather is another factor should be considered at measure rate of feathering . Growing alongside each primary feather is a covert, each primary feather and covert being enclosed in a sheath. In early-feathering chicks the covert is about two-thirds as long as and more slender than the primary feather, whereas in late-feathering chicks, the covert is about the same length as the primary feather, which is almost as slender as the covert.

Several investigations have been carried out to study the Fayoumi chickens. However, little information has been published on the Feathering of the Fayoumis.

The purpose of the present work was to study the behavior of feathering frequency distribution of two Fayoumi lines (PP & GG) . The relations between feathering and body weight and relative growth rate were also studied.

MATERIALS AND METHODS

This experiment was carried out at Fayoum Poultry Research Station, Agricultural Research Center, Ministry of Agricultural, Fayoum, Egypt.

Six hundred and thirty two, day-old unsexed Fayoumi chicks, hatched late April, were used in this experiment. These chicks represents two lines of Fayoumi breed, 305 chicks from an egg production line (denoted as PP)

and 327 chicks from a growth line (denoted as GG). The PP line was selected for higher egg number, while the GG line was selected for heavier body weight at 8 weeks of age (**El-Hossari, 1970**). The hatched chicks were removed from the hatcher 21 days and 12 hours from setting the eggs. All chicks were wing-banded to keep their pedigree and immediately immunized for Marek's disease in the hatchery and individually weighed (BW0). The primary wing feathers (PR0) were counted and the secondary wing feathers (SEC0) were given two arbitrary grades. The first grade denoted as short while the second was denoted as long. The experimental chicks were reared in floor pens within a closed house.

At ten days of age, chicks tail feathers (T10) were counted. Chicks were weighed at four (BW4) and eight (BW8) weeks of age. At eight weeks of age the primary (PR8) and secondary (SEC8) feathers were counted again and were also given three arbitrary scores for back cover feathering (COV8) as follows: (3) fully feathered. (2) back feathered with sides bare and (1) back and sides bare. Mortalities were recorded daily.

Traits studied were: feather frequency distribution “ primary and secondary feather numbers at hatch and eight weeks of age, number of tail feathers at ten days of age and back cover at eight weeks of age “; body weight to the nearest gram at 0, 4 and 8 weeks of age for both sexes. Estimating relative growth rate was done according to **Broody, 1945**.

Statistical Analysis :

Data were statistically analyzed by **SAS (2000)** software using the General Linear Model (GLM). Duncan's Multiple Range Test (**Duncan, 1955**) was used to test differences between treatment means when significance existed.

RESULTS AND DISCUSSION

Type of Feathering

Data in Table (1) points out that the **primary feathers (PR0)** of the PP females were faster growing than the GG females at hatch. However, the GG males were faster feathering than the PP males at the same age. **El Masri (1959)** reported that the frequencies of early feathered chicks were about 79.9, 99.8 and 83.1 per cent of hatched chicks in Fayoumi, Leghorn and Rhode Island Red breeds, respectively. The crosses between Fayoumi and Leghorn had a higher percentage of early feathered chicks than Fayoumi chicks.

Inspection of data in Table (1) showed that the length of females **secondaries feathers (SEC0)**, for both the PP and GG lines, were longer than those of the males at hatch. **Siegel et al. (1957 a)** used the length of secondaries, at hatch, as a criterion for early and late feathering. **Warren (1930 b)** observed that the relative length of secondaries, as compared to the down, is a reliable criterion for the identification of rapid feathering of the day-old chick.

Data of Table (1) indicated that higher percentages of the PP males and females had 11 or more **tail feathers (T10)** than those of the males and females GG at ten days. On the other hand, higher percentage of females had 11 or more tail feathers than males in both lines. **Warren (1953)** reported that early feathered chicks can be identified, at ten days of age, if they have well developed tail feathers from 1/4 to 3/8 inches in length. Moreover, he stated that the wing feathers, of fast feathering birds, when folded on the sides of the body, will extend considerably beyond the length of the body, at this age. **Shebl et al. (1990)** reported that the ratio of coverts number to number of tail feathers, of fast feathering birds, was estimated to be (27.75 %) at ten days of age.

Data of Table (1) indicates that more PP females had 10 **primary feathers (PR8)**, than GG females, **at eight weeks of age**. On the other hand, higher percentage of GG males, had 10 primary feathers, at eight weeks of age than the PP males.

Data of Table (1) shows that a higher proportion of PP and GG males, had 14 **secondary feathers, at eight weeks of age (SEC8)** than PP and GG females. Higher percentage of PP males had 14 secondaries, at eight weeks of age, than GG males.

It can be seen, from Table (1), that the percentage of **fully feathered (COV8)** GG line males and females were higher than those of the PP line. Higher percentage of both PP and GG females were fully feathered at eight weeks of age than PP and GG males.

Body weight at four weeks (BW4)

Data of Table (2) indicates that the mean four weeks body weight of the GG males was significantly heavier than that of the PP males. These results agree with **Abdel-Wares (1976)**. He reported that the male body weight of these two Fayoumi lines, at 4 weeks of age, were 211 and 203 for the GG and PP lines, respectively. The corresponding figures for the females were 193 and 183 gms for the same lines respectively. **Sabri (1979)** reported that the male body weight of these two Fayoumi lines at 4 weeks of age were

255 and 223 for the GG and PP lines, respectively. The corresponding figures for the females were 239 and 207 gms for the same lines, respectively.

Body weight at eight weeks (BW8)

Table (2) indicates that the mean eight weeks body weight of the GG males was significantly heavier than that of the PP males. These results agree with **El-Hossari (1970)**. He reported that the average body weights of these two Fayoumi lines were 542 and 398 gms for the GG and PP lines at eight weeks of age, respectively. **Abdel-Wares (1976)** reported that the eight week body weights of GG and PP Fayoumi lines were 522 and 499 gms for males, and 482 and 430 gms for females, respectively. **Sabri (1979)** reported that the male body weights of these two Fayoumi lines at eight weeks of age were 642 and 543 for the GG and PP lines, respectively. The corresponding figures for the females were 572 and 480 gms for the same lines respectively. **El-Kaiaty and Hassan (2004)** reported that the average eight weeks body weight of the Fayoumi females was 610 grams. **El Masri (1959)** reported that the mean body weight of the Fayoumi birds, was less than that of the Rhode Island Red birds for both males and females. In both breeds, the chicks that were typed as early in feathering, had consistently heavier body weights than those typed as late in feathering. However, the differences in body weights between the two types of feathering were not significant. **Engelmann (1975)** reported that the birds which were better feathered usually had a slightly larger body weight.

Effect of secondary feathers length, at hatch, on body weight

Data tabulated in Table (3) indicated that the secondary feathers length, at hatch, was negatively related to body weight of the PP line at hatch, four weeks and eight weeks of age. On the other hand, it was positively related for the GG line at the same ages.

Effect of the two lines on studied characteristics

Data (Table 4) indicates that there were no significant differences between the PP and GG lines in: Body weight at hatch; Number of primary feathers at hatch and Number of secondary feathers at eight weeks of age.

The data (Table 4) also indicates that the PP line had significantly higher: Secondary feathers index at hatch and Number of tail feathers at ten days of age than the GG line. However, the GG line had significantly higher: Body weight at four weeks; Number of primary feathers at eight weeks; Cover feathers index at eight weeks and Body weight at eight weeks than the PP lines.

There were significant differences in body weight between the two lines at four and eight weeks of age. However, this difference was not present at hatch. This is because body weight at hatch depends mainly on egg size “maternal effect” Table (4). These findings are comparable with those cited by **Abou El-Ella, 1982** , **Sabra, 1990**, **Shebl *et. al.*, 1990** , **Mandour *et. al.*, 1992** and **Nawar, 1995**.

Data (Table 5) indicates that the PP line males had significantly higher: Body weight at four weeks and eight weeks of age than the PP line females. However, the PP line females had significantly higher: Number of tail feathers at ten days; Cover feathers index at eight weeks than the PP line males.

The data (Table 5) also indicates that there were no significant differences between the two sexes of the PP line in: Number of primary feathers at hatch ; Secondary feathers index at hatch; Number of primary feathers at eight weeks and Number of secondary feathers at eight weeks of age.

Data indicates that there were no significant differences between the two sexes of the GG line in: Body weight at hatch; Number of primary feathers at hatch; Secondary feathers index at hatch; Number of tail feathers at ten days; Number of secondary feathers at eight weeks and Cover feathers index at eight weeks (Table 5).

The data (Table 5) also indicates that the GG line males had significantly higher: Body weight at four weeks; Number of primary feathers at eight weeks and Body weight at eight weeks of age than the GG line females.

Phenotypic correlation coefficient between Feathering and body weights

Inspection of data in (Table 6) indicates the presence of significant **positive** phenotypic correlation coefficients between Body weight at hatch and: Number of tail feathers at ten days (T10); Body weight at four weeks (BW4) and Body weight at eight weeks (BW8) of age. Also, significant **positive** phenotypic correlations were obtained between Body weight at four weeks and: Secondary feathers number at eight weeks; Cover feathers index at eight weeks and Body weight at eight weeks of age (Table 6). Besides, significant **positive** phenotypic correlations were obtained between body weight at eight weeks and: Secondary feathers number at eight weeks and Cover feathers index at eight weeks of age (Table 6). **Hurry *et al.* (1953)** reported that highly significant coefficients of phenotypic and

environmental correlations were present between 8-week body weight and feather score. Their values were 0.28 and 0.32, respectively.

Relative growth rate

Inspection of data in Table (7) indicates that the relative growth rates of the GG males and females were faster than the PP males and females for the periods (0-4) wks and (4-8) wks and from (0-8) weeks . This is because the GG line was selected for high body weight at eight weeks of age “ growth line “ while the PP line was selected for high egg number “ egg production line ”. Also, relative growth rates of the PP and GG males were higher than the PP and GG females for the all periods studied (Table 7). **Rizkalla (1996)** reported that relative growth rates of Fayoumi males were 160.15 % and 62.83 % while they were 159.10 % and 61.48 % for Fayoumi females from (0-4) wks and (4-8) wks, respectively. Previous work had indicated that, in the various breeds of chickens, early feathered chickens grow faster than the late ones (**Glazener *et al.*, 1946, Hurry *et al.* , 1953, and Many others**).

CONCLUSSION

The length of the secondary feathers was negatively related with the body weight of the PP line at hatch, four weeks and eight weeks of age. However it was positively related in the GG line at the same ages.

Both the PP and GG females were faster in feathering than their corresponding males. Their secondary feathers were longer at hatch, their number of tail feathers were more at ten days of age, and they had more feathers covering at 8 weeks of age.

It could be concluded that we can select the females of the egg production line, at hatch using the length of secondary feathers to improve their body weight at 4 and 8 weeks of age.

Table (1) : Feather Frequency Distribution of the Tow Fayoumi Lines (PP & GG).

Traits	Line (Sample size)	Number of Feathers	Males Percent	Females Percent	
Number of Primary Feathers At Hatch (PRO)	PP	6	2.01	.....
	Males (149)	7	95.97	94.87	
	Females (156)	8	2.01	5.13	
	GG	6	1.74	.....
	Males (172)	7	94.77	96.77	
	Females (155)	8	3.49	3.23	
Secondary Feather Index At Hatch (SECO)	PP	1 (Short)	46.98	46.15	
	Males (149)	2 (Long)	53.02	53.85	
	Females (156)				
	GG	1(Short)	69.19	63.87	
	Males (172)	2 (Long)	30.81	36.13	
	Females (155)				
Number of Tail Feathers At Ten Days of age (T10)	PP	0	1.34	1.28	
	Males (149)	8	3.36	0.64	
	Females (156)	9	5.37	3.85	
		10	29.53	14.10	
		11	28.86	35.90	
		12	27.52	38.46	
		13	3.36	5.13	
		14	0.67	0.64	
	GG	0	16.86	14.94	
	Males (172)	7	1.74	.....
	Females (154)	8	3.49	3.90	
		9	15.70	10.39	
		10	33.72	25.33	
		11	15.12	25.97	
		12	12.79	19.48	
		13	0.58	.....
	Number of Primary Feathers At Eight Weeks of age (PR8)	PP	7	0.75
		Males (141)	8	32.62	41.05
Females (134)		9	62.41	51.50	
		10	4.97	6.72	
GG		7	.....	0.68
Males (170)		8	17.06	37.42	
Females (147)		9	72.35	57.14	
		10	10.59	4.76	
Number of Secondary Feathers At Eight Weeks of age (SEC8)		PP	10	0.71
		Males (141)	11	2.84	4.48
	Females (134)	12	31.92	42.54	
		13	53.19	48.51	
		14	11.35	4.48	
	GG	10	0.59	.....
	Males (170)	11	2.35	2.72	
	Females (147)	12	28.82	36.74	
		13	62.94	55.78	
		14	5.29	4.76	
	Cover Feather Index At Eight Weeks (COV8)	PP	2	84.40	72.39
		Males (141)	3	15.60	27.61
		Females (134)			
		GG	1	0.68
Males (170)		2	58.82	55.78	
Females (147)		3	41.18	43.54	

1 Back and sides bare
 2 Back feathered with sides bare
 3 Fully feathered

Table (2) : Body Weight Means and Frequency Distributions of the PP and GG Fayoumi Lines .

Traits	Line (N)	Body weight Range (gm)	Males		Females	
			Percent	Mean	Percent	Mean
Body weight At Four Weeks (BW4)	PP Males (143) Females (142)	50-100	3.50	90 ± 5.99	9.16	82 ± 3.71
		100-150	23.78	130 ± 1.99	42.25	132 ± 1.49
		150-200	53.15	177 ± 1.61	42.96	172 ± 1.76
		200-250	18.89	215 ± 2.19	5.63	218 ± 4.21
		250-300	0.70	253 ± .	.....	.....
		Mean		169 ± 2.92^b		149 ± 2.85^b
	GG Males (172) Females (155)	50-100	.....	.....	3.87	90 ± 2.78
		100-150	11.05	141 ± 2.74	27.74	131 ± 1.96
		150-200	51.75	179 ± 1.44	56.13	175 ± 1.50
		200-250	35.47	219 ± 1.74	12.26	217 ± 3.07
		250-300	1.74	262 ± 5.24	.....	.....
		Mean		188 ± 2.30^a		165 ± 2.66^a
	Body weight At Eight Weeks (BW8)	PP Males (141) Females (134)	150-200	0.75	164 ± .
200-250			.....	.....	2.99	224 ± 9.66
250-300			0.71	296 ± 10.65	4.48	285 ± 4.35
300-350			2.13	319 ± 11.08	8.21	331 ± 4.19
350-400			9.22	379 ± 4.04	21.64	378 ± 2.75
400-450			17.73	430 ± 2.90	29.10	427 ± 2.26
450-500			17.02	478 ± 2.27	11.19	475 ± 3.01
500-550			17.02	529 ± 2.54	17.91	515 ± 2.54
550-600			21.99	574 ± 2.40	2.99	569 ± 6.68
600-650			9.22	619 ± 3.37	.....	.....
650-700		3.55	665 ± 5.67	.....	.....
700-750		1.42	738 ± 8.50	.....	.....
		Mean		509 ± 7.44^b		410 ± 7.28^b
GG Males (170) Females (147)		150-200	.....	.....	1.36	197 ± 1.00
		200-250	.....	.....	1.36	230 ± 19.50
		250-300	.....	.....	1.36	288 ± 1.00
		300-350	1.18	320 ± 12.73	1.36	332 ± 10.40
		350-400	.....	.....	8.16	380 ± 4.16
		400-450	2.94	431 ± 6.04	14.29	425 ± 2.95
		450-500	10.59	478 ± 3.11	23.13	473 ± 2.36
	500-550	20.59	529 ± 2.50	29.93	528 ± 2027	
	550-600	15.88	579 ± 2.67	14.29	575 ± 3.18	
	600-650	25.88	622 ± 2.11	3.40	621 ± 6.33	
650-700	14.71	674 ± 2.97	0.68	686 ± 10.28		
700-750	6.47	721 ± 3.15	0.68	747 ± 10.45		
750-800	1.18	774 ± 14.50	.....	.....
800-850	0.59	806 ± .	.....	.....
	Mean		588 ± 6.43^a		486 ± 7.20^a	

PP : Line selected for higher egg number.

GG : Line selected for heavier body weight at 8 weeks of age.

a, b Mean values within trait, age, and sex between lines with different superscript differ significantly ($p \leq 0.05$) from each other (Duncan,1955).

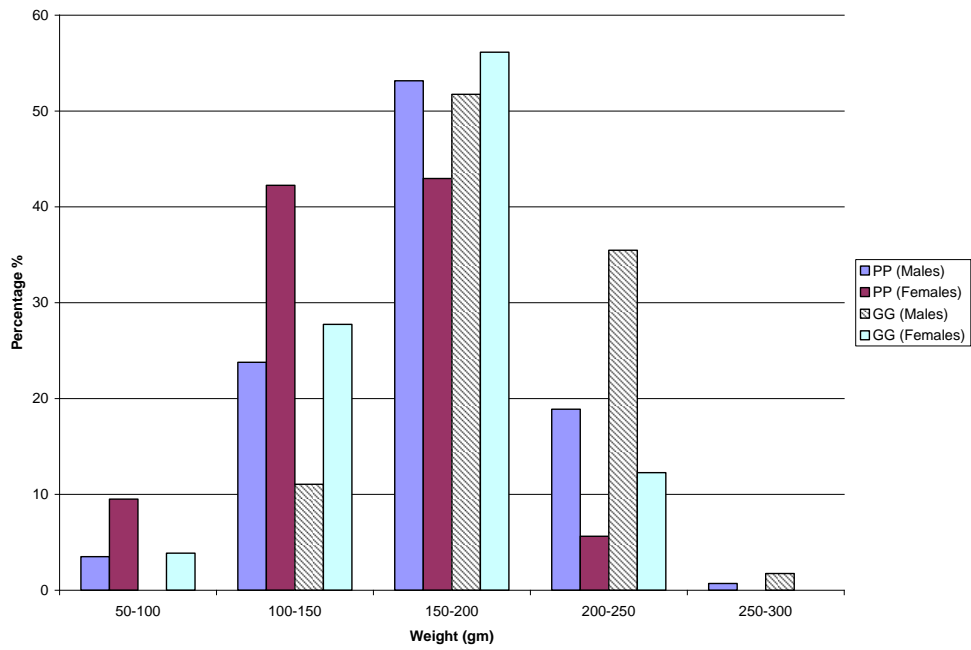


Figure (1): Frequency distribution of four weeks body weights (BW4)

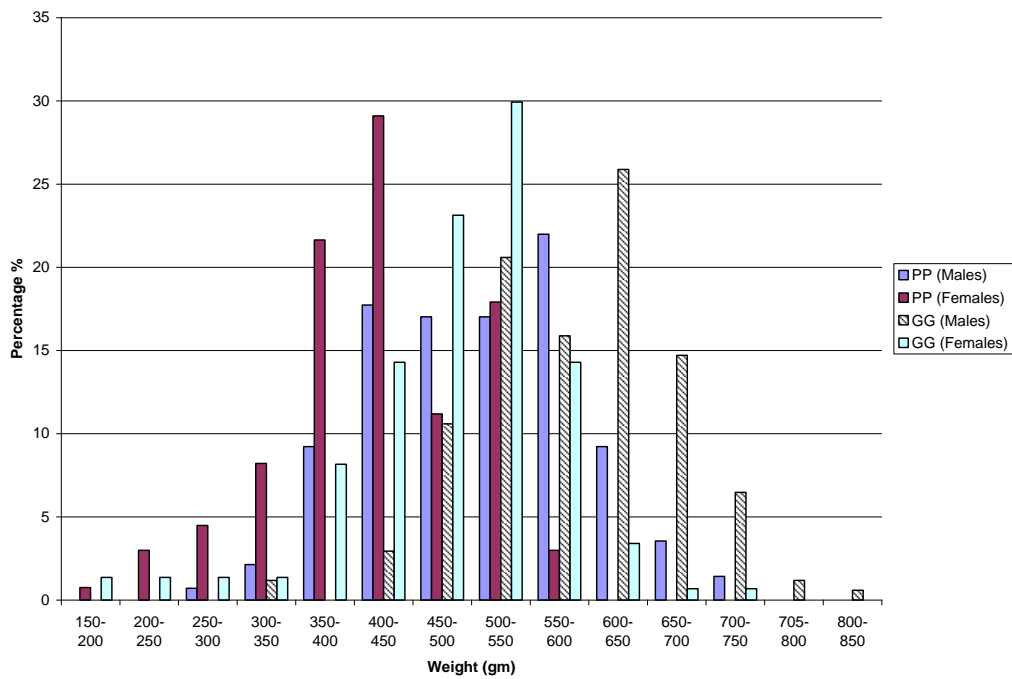


Figure (2): Frequency distribution of eight weeks body weights (BW8)

Table (3): Effect of secondary feathers length, at hatch, on body weight of the two Fayoumi lines (Males + Females)

Line	Length of Secondary feathers at hatch		Body Weight at		
			Hatch	4 Weeks	8 Weeks
PP	Short	Mean No.	30.2 ± 0.19 ^a (141) *	163.6 ± 3.09 ^a (134)	478.7 ± 8.49 ^a (129)
	Long	Mean No.	29.9 ± 0.18 ^a (164)	155.1 ± 2.91 ^b (151)	453.5 ± 7.98 ^b (146)
GG	Short	Mean No.	29.7 ± 0.16 ^a (219)	175.1 ± 2.27 ^a (219)	533.5 ± 6.84 ^b (211)
	Long	Mean No.	29.9 ± 0.23 ^a (108)	181.1 ± 3.24 ^a (108)	556.1 ± 9.65 ^a (106)

PP : Line selected for higher egg number .

GG : Line selected for heavier body weight at 8 weeks of age .

* Sample size between brackets.

a, b Values within trait, and line between length of secondary feathers at hatch with different superscript differ significantly ($p \leq 0.05$) from each other (Duncan,1955).

Effect of Genotype on Studied Characters at Hatch , 4 weeks and 8 weeks of Age (Males + Females).

OTYPE	Trait	BW0	PR0	SEC0	TAILL	BW4	PR8	SEC8	COV8	BW8
PP	Mean	30.03 ^a	7.03 ^a	1.54 ^a	10.94 ^a	159.09 ^b	8.68 ^b	12.63 ^a	2.22 ^b	465.29 ^b
	No.	± 0.13 (305) *	± 0.01 (305)	± 0.03 (305)	± 0.16 (305)	± 2.06 (285)	± 0.03 (275)	± 0.04 (275)	± 0.03 (275)	± 5.94 (275)
GG	Mean	29.79 ^a	7.03 ^a	1.33 ^b	8.87 ^b	177.09 ^a	8.81 ^a	12.66 ^a	2.42 ^a	541.04 ^a
	No.	± 0.13 (327)	± 0.01 (327)	± 0.03 (327)	± 0.15 (326)	± 1.92 (327)	± 0.03 (317)	± 0.04 (317)	± 0.03 (317)	± 5.53 (317)

PP : Line selected for higher egg number.

GG : Line selected for heavier body weight at 8 weeks of age .

BW0 : Body weight at hatch.

SEC0 : Secondary feathers index at hatch.

BW4 : Body weight at four weeks.

SEC8 : Secondary feathers number at eight weeks .

BW8 : Body weight at eight weeks .

* Sample size between brackets.

a, b Values within trait, between lines with different superscript differ significantly ($p \leq 0.05$) from each other (Duncan,1955).

PR0 : Primary feathers number at hatch .

TAILL : Tail feathers number at ten days .

PR8 : Primary feathers number at eight.

COV8: Cover feathers index at eight weeks.

Effect of Sex on Studied Characters at Hatch, 4 weeks and 8 weeks of Age (Males & Females).

SEX	Mean & No.	BW0	PR0	SEC0	TAIL	BW4	PR8	SEC8	COV8	BW8
Males	Mean	30.57 ^a	7.00 ^a	1.53 ^a	10.71 ^b	169.45 ^a	8.72 ^a	12.72 ^a	2.16 ^b	508.57 ^a
	±	±	±	±	±	±	±	±	±	±
Male	No.	2.22 (149)	0.20 (149)	0.50 (149)	1.69 (149)	2.92 (143)	0.55 (141)	0.73 (141)	0.36 (141)	7.44 (141)
Females	Mean	29.60 ^b	7.05 ^a	1.54 ^a	11.13 ^a	148.67 ^b	8.64 ^a	12.53 ^a	2.28 ^a	419.86 ^b
	±	±	±	±	±	±	±	±	±	±
Female	No.	2.15 (156)	0.22 (156)	0.50 (156)	1.60 (156)	2.85 (142)	0.62 (134)	0.66 (134)	0.45 (134)	7.28 (134)
Males	Mean	29.91 ^a	7.02 ^a	1.31 ^a	8.46 ^a	188.24 ^a	8.94 ^a	12.70 ^a	2.41 ^a	587.63 ^a
	±	±	±	±	±	±	±	±	±	±
Male	No.	2.50 (172)	0.23 (172)	0.46 (172)	3.97 (172)	2.30 (172)	0.52 (170)	0.63 (170)	0.49 (170)	6.43 (170)
Females	Mean	29.80 ^a	7.03 ^a	1.36 ^a	8.97 ^a	164.70 ^b	8.66 ^b	12.63 ^a	2.43 ^a	485.72 ^b
	±	±	±	±	±	±	±	±	±	±
Female	No.	2.30 (155)	0.18 (155)	0.48 (155)	3.91 (154)	2.66 (155)	0.58 (147)	0.62 (147)	0.51 (147)	7.20 (147)

PP : Line selected for higher egg number.

GG : Line selected for heavier body weight at 8 weeks of age.

BW0 : Body weight at hatch.

PR0 : Primary feathers number at hatch.

SEC0 : Secondary feathers index at hatch.

TAIL : Tail feathers number at ten days.

BW4 : Body weight at four weeks.

PR8 : Primary feathers number at eight.

SEC8 : Secondary feathers number at eight weeks.

COV8 : Cover feathers index at eight weeks.

BW8 : Body weight at eight weeks.

Sample size between brackets.

a, b Values within trait, and line between sexes with different superscript differ significantly ($p \leq 0.05$) from each other (Duncan,1955).

Table (6): Phenotypic Correlation Coefficients Between Feathering and Body weights for the GG and PP Lines.

	BW0	PR0	SEC0	TAIL	BW4	PR8	SEC8	COV8
BW0								
PR0	0.024 (632)							
SEC0	- 0.006 (632)	0.040 (632)						
TAIL	0.237* (631)	- 0.064 (631)	0.104 (631)					
BW4	0.277 ** (612)	- 0.028 (612)	- 0.066 (612)	0.076 (611)				
PR8	- 0.022 (592)	0.148 (592)	- 0.038 (592)	- 0.134 (591)	- 0.041 (592)			
SEC8	0.049 (592)	0.076 (592)	- 0.029 (592)	- 0.023 (591)	0.191* (592)	0.061 (592)		
COV8	0.028 (592)	0.018 (592)	- 0.065 (592)	0.069 (591)	0.299 ** (592)	0.021 (592)	0.055 (592)	
BW8	0.190* (592)	- 0.018 (592)	- 0.075 (592)	- 0.106 (591)	0.804 ** (592)	0.014 (592)	0.195* (592)	0.307** (592)

PP : Line selected for higher egg number at 8 weeks of age .

GG : Line selected for heavier body weight at 8 weeks of age .

BW0 : Body weight at hatch.

PR0 : Primary feathers number at hatch

SEC0 : Secondary feathers index at hatch.

TAIL : Tail feathers number at ten days

BW4 : Body weight at four weeks.

PR8 : Primary feathers number at eight.

SEC8 : Secondary feathers number at eight weeks .

COV8: Cover feathers index at eight weeks.

BW8 : Body weight at eight weeks .

Sample size between brackets.

* significant Correlations ($P \leq .05$) .

** significant Correlations ($P \leq .01$)

Table (7): Relative Growth Rate at Four Week Intervals of PP and GG Lines.

Line	Sex	Relative Growth Rate %		
		(0-4) wk	(4-8) wk	(0-8) wk
PP	Male	138.87	100.03	177.32
	Female	133.58	95.40	173.66
GG	Male	145.16	102.95	180.63
	Female	138.71	98.71	176.88

PP : Line selected for higher egg number.

GG : Line selected for heavier body weight at 8 weeks of age .

REFERENCES

- Abdel-Wares, H. (1976).** *Selection for egg production based on brothers characters. M. Sc. Thesis, Ain-Shams Univ. Cairo.*
- Abou-El-Ella, N. Y. (1982) .** *A Comparative study on the performance potentiality of four locally developed strains and their F1 crosses . M. SC. Thesis , Fac. Of Agric. Univ. of Alexandria, Egypt.*
- Broody, S. (1945) .** *Bioenergetics and growth. Reinhold pub . Crop, N. V. , U.S.A.*
- Duncan, D. B. (1955) .** *Multiple F-test Biometrics, 11 : 1-42 .*
- El-Hossari, M. A. (1970) .** *The effect of Selection for high body weight and high egg number on genetic and phenotypic variation in two strains of Fayoumi chickens . U.A.R. J. Anim. Prod., Vol. 10, No. 1, pp. 55-63 .*
- El-Kaiaty, A.M., and M.S.H. Hassan (2004).** *Some physiological and immunological parameters in the female of local chicken strains . Egypt. Poult. Sci. 24 (IV) : 901 – 916.*
- El Masri, G. Ch. (1959).** *A Study of Feathering and Its Relationship to Body Size in Fayoumi Chickens. M.SC. Thesis, Fac. of Agric., Alex. Univ., Egypt.*
- Engelmann, C. (1975).** *Verebungsgrundlagen und Zuchtmethod, beim Geflugel . Neuman Verlag. Leipzig.*
- Glazener, E. W., and M.A.Jull (1946) .** *Rate of feathering and ten-week body weight observations in strains differing in shank length . Poultry Sci. 25 : 433- 439 .*
- Hurry, H. F. , and A. W. Nordskog (1953) .** *A genetic analysis of chick feathering and its influence on growth rate . Poultry Sci. 32 : 18 – 25 .*
- Mandour, M. A. ; Sharaf , M. M . ; Kosba, M. A. ; and El-Naggar, N. M. (1992) .** *Estimation of combining ability and heterosis for some economic traits of chickens from a full diallel crosses. Egypt. Poultry Sci. 12 : 57 – 78.*
- Nawar, M. (1995) .** *A comparative study of some productive traits between some native and foreign breeds of chickens . Ph. D. Thesis, Fac. Of Agric., Minufiya Univ. , Egypt .*

- Rizkalla, H. E. (1996)** . *Evaluation of some local breeds for the physiological characteristics related to productive efficiency* . Ph. D. Thesis, Faculty of Agriculture, agazig University (Benha Branch).
- Sabra, Z. El. A. (1990)** . *Estimation of heterosis and combining ability for some economic traits in chickens* . M. Sc. Thesis, Zagazig Univ. Moshtohor, Egypt.
- Sabri, H. M. (1979)**. *Genetical studies on meat characteristics in Fayoumi chickens*.M.Sc. Thesis, Cairo Univ. Cairo.
- SAS Institute (2000)** . *SAS / Stat User's Guide : Version 8.1.For Windows*. SAS Institute Inc., Cary, NC, USA .
- Shebl , M. K. , A. Ali Mervat, M. Balat Magda and T. H. Tag El-Din (1990)** . *Evaluation of combining ability for some body-size traits and feathering in a diallel cross of chickens*. *Egypt. Poult. Sci.* 10 : 159 – 178.
- Siegel, P. B. , C. D. Mueller, and J.V. Craig (1957 a)** . *Some Phenotypic Differences Among Homozygous, Heterozygous, and Hemizygous Late feathering chick*. *Poultry Sci.* 36 : 232 –239.
- Warren, D. C. (1930 b)** . *Crossbred Poultry* . *Kansas Agr. Stat. Bull.* 232 . “ Cited by Hutt *Genetics of the fowl* . p. 134 “
- Warren, D. C. (1953)** . *Practical Poultry Breeding* . *The Macmillan Company, N. Y.*

الملخص العربي

القلش الطبيعي في دجاج الفيومي

١ -دراسة التريش وعلاقتة بوزن الجسم في خطين من الدجاج الفيومي

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استخدم عدد 632 كتكوت فيومي غير مجنس فاقس اواخر شهر ابريل (305 كتكوت من الخط المنتخب لزيادة عدد البيض و 327 كتكوت من الخط المنتخب لزيادة وزن الجسم على عمر 8 اسابيع . النتائج تشير الى ان خطي الفيومي كان سريعي التريش ، ريش القوادم لاناث خط انتاج البيض اسرع نموا من اناث خط انتاج اللحم عند الفقس بينما ذكور خط انتاج اللحم اسرع في نمو الريش عن ذكور خط انتاج البيض عند نفس العمر . ووجد ان طول ريش الخوافي لاناث كل من الخطين كانت اطول من الذكور عند الفقس . كما وجد ان النسبة المئوية للافراد (ذكور واناث) خط انتاج البيض التي لا يقل عدد ريش ذيلها عند عمر 10 أيام عن 12 ريشة أعلى من ذكور واناث خط انتاج اللحم كما وجد ان نسبة الاناث التي لديها 12 ريشة ذيل عند نفس العمر اعلى من الذكور في كل من الخطين .

كما وجد ان النسبة المئوية لريش تغطية الجسم فى ذكور واناث خط انتاج اللحم اكبر من ذكور واناث خط انتاج البيض عند عمر 8 اسابيع بينما وجد ان النسبة المئوية لريش تغطية الجسم لاناث الخطين اكبر من ذكور الخطين .

وجد ايضا ارتباط معنوى موجب بين وزن الجسم عند الفقس وكل من عدد ريش الذيل عند عمر 10 أيام، وزن الجسم عند 4 اسابيع ، وزن الجسم عند 8 اسابيع . ايضا وجد ارتباط معنوى موجب بين وزن الجسم عند عمر 4 اسابيع وكل من عدد ريش الخوافى عند 8 اسابيع ، ريش تغطية الجسم عند 8 اسابيع ، وزن الجسم عند 8 اسابيع . بالاضافة الى وجود ارتباط معنوى موجب بين وزن الجسم عند عمر 8 اسابيع وكل من عدد ريش الخوافى عند 8 اسابيع ، و ريش تغطية الجسم عند 8 اسابيع .

معدل النمو لذكور واناث خط انتاج اللحم كان اسرع من ذكور واناث خط انتاج البيض للفترات من 0-4 ، 4-8 ، 8-0 اسبوع من العمر . ايضا معدل النمو لذكور الخطين كان اسرع من اناث الخطين لكل الفترات .

كما وجد ايضا ان طول ريش الخوافى يتناسب "معنويا" تناسب عكسيا مع وزن الجسم فى خط انتاج البيض عند عمر الفقس ، 4 اسابيع ، 8 اسابيع بينما يتناسب "غير معنوى" تناسبيا طرديا مع وزن الجسم فى خط انتاج اللحم عند نفس الاعمار . وعلية يمكن انتخاب اناث خط انتاج البيض عند الفقس باستخدام طول ريش الخوافى فى تحسين وزن الجسم عند عمر 4 ، 8 اسبوع