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Effect of Thyroxine, Estradiol, and ACTH on Egg Characters and some Reproductive Organs in Fayoumi

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A TOTAL of 120 Fayoumi hens in their first laying season were divided equally into four groups. One group served as the control, while the other three groups received thyroxine, estradiol, and ACTH. Each group was divided into two subtreatment according to the level of the hormone. The total dose of the hormone was given once a week or divided to seven times for the daily injection. The subtreatment of the control received saline solution either weekly or daily corresponding to the subhormonal level in the other three groups. The experiment lasted for 4 weeks during the summer time. The treated groups received the dose at the first and at the third week of the experimental period. The bidrs were kept individually in batteries and tfle egg parameters were daily recorded. The birds were slaughtered at the end of the experiment and the weight of the ovaries and the oviducts beside the length of the oviducts were measured. The following results were obtained :

1. A significant increase ($P < 0.01$) in egg weight was observed by thyroxine treatment over the other treatments. On the other hand, the reverse picture was found with respect to egg number or egg mass as the number of the eggs or the egg mass increased by estradiol, ACTH, and the control than the thyroxine treatment. The differences between means of thyroxine and the others were found to be significant ($P < 0.01$). Meanwhile the estradiol treatment increased the egg mass over the general mean than the others and the difference was significant ($P < 0.05$).

2. The daily treatment caused a significant increase ($P < 0.05$) in egg weight.

3. The egg mass or the egg number attained its peak at the second week and the differences between the second weeks and other weeks were found to be significant ($P < 0.01$). The mean of the third week for the egg number reached its minimum and the difference between the third and the first week was significant ($P < 0.01$).

4. Some aspects of female genital systems related with productivity trait were discussed.

Several hormones including thyroxine, estrogen, and ACTH are thought to be integrally involved with productivity. ATCH appears to stimulate steroid hormones (corticosterone, estrogen etc.) in the pathway between cholesterol and progesterone in the adrenals (Frankel, 1970). Thyroid hormone in female mammals is always associated with high levels of estrogen(Sidky *et al.*, 1958). The changes in the thyroid activity of the hens during the ovulatory cycle where progesterone secreted by ovary (Susan and Sharaf, 1975), or by the adrenals(Feeder *et al.*, 1971 and Lawton, 1972) is the excitatory hormone for the release of LH and subsequently induce ovulation (Wilson and Sharp, 1975b).

Injecting the birds with estrogen had proved to increase egg production (Black and Booth, 1946 ; Liu and Liang, 1962 ; Prahov, 1964, Sharaf *et al.*, 1966, Heald *et al.*, 1967 and 1968 Wilson and Sharp 1975 a, b and 1976, and Sturkie, 1976). ACTH injection induces ovulation (Van Tienhoven, 1961, Etches and Cunningham, 1976). Several investigators (Reineke and Turner, 1945; Turner *et al.*, 1945 b, Turner and Kempster, 1947 a Turner, 1948; a Turner *et al.*, 1945b, Turner and Kempster, 1947 ; Turner, 1948a ; Blexter *et al.*, 1949; Booker and Sturkie, 1950 ; Roos and Clandinin, 1975 ; and Olumu *et al.*, 1975a and b)were able to increase egg production in hot weather by feeding thyroid-active material as a replacement of decreased thyroidal activity during summer. On the contrary, by feeding thyroprotein, Hutt and Gowe, (1948), Godfrey (1949) ; Wilson (1949) and Oloufa (1953 and 1954)found that the egg production decreased. The biological half life of the thyroid hormone in chickens is few hours, whereas in mammals it is about 7 days (Little and Ingbar, 1964). This finding would suggest further observations. The objective of this study was to detemine the effect of the daily and/or weekly doses of different hormones (thyroxine, estradiol and ACTH) at the summer time on egg characteristics and reproductive organs in Fayoumi hens.

Material and Methods

A total of 120 Fayoumi hens at their first laying season in summer time were divided equally into four treatments, where the body weight was approximately the same (1486.9 g). The first one served as a control, while the other three treatments received thyroxine, estradiol and ACTH. Each treatment was divided to two sub-groups according to hormonal dosage either given once a week or 7 times a week (daily injection). The control birds were injected with saline solution with the same procedure as the hormonal treatments. The dose per bird for each treatment either daily or weekly was as follows :

Treatment	*Daily*	*Weekly*
L.Thyroxine	2 ug/ml	14 ug/ml
Estradiol	0.5 mg	3.5 mg
ACTH	21. U/ml	14 I.U. /ml

Each treated group received the hormonal dosage at the first (Period 1), and at the third (Period 3) week of the experimental period which lasted one month. Each hen was kept individually in the battery, where the eggs were daily collected . The eggs were weighed and their specific gravity were determined by saline solution.

At the end of the experiment, the birds were slaughtered and the weights of the ovaries and the oviducts along with the length of the oviducts were measured (Pigmented and non-pigmented parts). All birds were supplied *ad-libitum* with balanced feed and water. The data were analysed for statistical method according to Snedecor and Cochran (1968).

Results and Discussion

1. *Egg characteristics*

a) *Egg number and egg mass*

Tables 1 and 2 show the effect of the hormonal treatments on egg number and egg mass. The hormonal effects on these two parameters were significant as shown in Table 3. The mean of the egg number for each bird by the thyroxine treatment was 2.52, while it was 3.16 by the control hens (Table 1). The corresponding values for the egg mass were 111.76 and 131.05 for thyroxine and control groups, respectively (Table 2). The decrease in the egg production due to thyroxine compared with the control amounted to about 17%. This difference was found to be significant ($P < 0.01$) as shown in Table 2. The observed reduction in egg production due to thyroxiçe treatment is in agreement with previous reports (Hutt and Gowe, 1948 ; Godfrey, 1949 ; Berg

TABLE 1. **Effect of weekly or daily dose for the different hormones at 4 periods of summer on egg number of Fayoumi layers.**

Treatments	Groups	Period 1 Mean±S.E.	Period 2 Mean±S.E.	Period 3 Mean±S.E.	Period 4 Mean±S.E.	Period Mean Mean±S.E.
Thyroxine	Weekly	2.83±0.40	3.46±0.29	2.58±0.47	2.20±0.42	2.77±0.19
	Daily	2.41±0.31	2.92±0.26	2.22±0.36	1.57±0.30	2.28±0.15
	Average	2.62±0.25	3.19±0.19	2.40±0.30	1.88±0.27	2.52±0.12
Estradiol	Weekly	3.16±0.40	4.00±0.36	3.28±0.46	3.09±0.46	3.38±0.21
	Daily	3.46±0.42	2.38±0.37	3.61±0.37	3.09±0.41	3.14±0.19
	Average	3.31±0.29	3.19±0.25	3.44±0.29	3.09±0.30	3.25±0.14[a]
A.C.T.H	Weekly	3.38±0.37	3.91±0.34	2.81±0.50	3.20±0.49	3.33±0.20
	Daily	2.83±0.40	3.46±0.37	2.44±0.44	3.00±0.45	2.93±0.21
	Average	3.10±0.27	3.68±0.23	2.62±0.33	3.10±0.36	3.12±0.14[a]
Control	Weekly	2.30±0.39	3.54±0.47	2.33±0.33	2.42±0.61	2.64±0.23
	Daily	4.10±0.23	4.33±0.24	2.71±0.37	3.60±0.45	3.68±0.16
	Average	3.20±0.22	3.93±0.25	2.52±0.27	3.01±0.35	3.16±0.13[a]
General Mean	Weekly	2.96±0.20	3.73±0.18	2.84±0.24	2.76±0.24	3.10±0.11
	Daily	3.18±0.20	3.83±0.18	2.82±0.20	2.91±0.25	3.23±0.11
	Average	3.07±0.13b	3.78±0.12	2.82±0.15b	2.83±0.16b	3.16±0.08

a or b : Means do not differ from each others at $P<0.05$

TABLE 2. **Effect of weekly or daily dose for the different hormones at 4 periods of summer on egg mass of Fayoumi layers** (in g).

Treatments	Group	Period 1 Mean ± S.E.	Period 2 Mean ± S.E.	Period 3 Mean ± S.E.	Period 4 Mean ± S.E.	General mean Mean ± S.E.
Thyroxine . .	Weekly	125.05 ± 18.20	153.30 ± 12.09	113.85 ± 20.04	93.81 ± 18.04	121.50 ± 8.30
	Daily	105.70 ± 12.79	131.48 ± 11.39	99.93 ± 16.76	71.04 ± 14.02	102.40 ± 5.54
	Average	115.37 ± 10.88	142.39 ± 5.96	106.89 ± 13.21	82.42 ± 11.75	111.76 ± 5.10
Estradiol . . .	Weekly	127.04 ± 17.51	171.94 ± 16.60	136.92 ± 21.04	128.94 ± 17.91	141.21 ± 9.02
	Daily	152.21 ± 19.29	191.09 ± 16.26	158.51 ± 16.18	138.27 ± 19.53	160.02 ± 8.73
	Average	139.62 ± 13.00	181.51 ± 11.38	147.71 ± 13.15	133.60 ± 12.93	150.61 ± 6.24
A.C.T.H.	Weekly	140.75 ± 15.79	164.96 ± 15.00	116.97 ± 21.56	133.02 ± 20.34	138.93 ± 8.71
	Daily	116.00 ± 15.58	148.36 ± 14.58	99.04 ± 15.93	123.92 ± 25.23	121.83 ± 7.98
	Average	128.37 ± 10.87	156.66 ± 10.23	108.00 ± 13.51	128.47 ± 15.12	130.37 ± 5.93[a]
Control . . .	Weekly	95.36 ± 16.27	149.11 ± 19.75	94.90 ± 14.14	102.00 ± 25.23	110.34 ± 9.42
	Daily	168.17 ± 10.81	190.51 ± 11.12	114.95 ± 16.43	157.55 ± 22.07	157.80 ± 7.53
	Average	131.76 ± 9.51	169.81 ± 10.61	104.92 ± 12.04	129.77 ± 16.11	134.06 ± 5.86[a]
General mean .	Weekly	123.59 ± 8.57	160.17 ± 7.78	119.52 ± 10.50	115.81 ± 9.96	131.05 ± 4.74
	Daily	135.21 ± 8.56	165.36 ± 7.51	121.35 ± 8.86	127.68 ± 11.41	139.10 ± 4.59
	Average	129.40 ± 5.63b	162.77 ± 5.00	120.44 ± 6.46b	121.74 ± 6.85b	135.07 ± 3.30

a or b : Means do not differ from each other at $P < 0.05$

Egg mass : egg number X egg weight

TABLE 3. **Analysis of variance for the different traits studied in Fayoumi layers.**

S.O.V.	Egg number		Egg mass		Egg weight		Egg specific gravity	
	d.f	M.S.	d.f.	M.S.	d.f.	M.S.	d.f.	M.S.
T	3	13.90**	3	20726.35**	3	177.40**	3	0.000827**
P	3	19.03**	3	37687.39**	3	2.37	3	0.008988**
D	1	1.44	1	5757.97	1	75.21*	1	0.000135
T × P	9	1.57	9	1840.98	9	14.75	9	0.000079
T × D	3	5.27*	3	16534.45**	3	36.17	3	0.000258
P × D	3	3.33	3	243.19	3	18.93	3	0.000077
T×P×D	9	1.40	9	3602.53	9	6.71	9	0.000156
Error	324	1.80	324	3376.78	324	15.86	319	0.000165

*Significant ($P < 0.05$)

**Highly significant ($P < 0.01$)

T: Treatments P = period D = dose treatment

and Bearse, 1951 and Oloufa, 1953). On the other hand, estradiol treatment was found to improve significantly egg number (Table 1) or egg mass ($P < 0.05$) as shown in Table 2. The increase in egg production by the estradiol treatment was confirmed by higher clutch size for estradiol over the other treatments (Table 4) as the productivity of the hen is generally influenced by the length of its clutch (Nalbandov, 1958 ; and Heald *et al.*, 1967). The thyroxine clutch size was lower than the other hormonal treatments and the differences were significant (Table 4). This finding coincides with the results obtained in either egg number or egg mass (Tables 1 and 2). This improvement in egg production by estradiol treatment is in accordance with Prahov (1964), and Sharaf *et al.* (1966), who explained this phenomenon by the physiological effect of estrogens upon the ovary and the oviduct which causing their activation and enhancing ovulatory processes. The ACTH group had no effect on egg production compared with the control group (Tables 1 and 2).

The data showed insignificant difference between weekly or daily doses (Table 3) however the interaction between treatments and the dose was found to be significant for the egg number ($P<0.05$) and for the egg mass ($P<0.01$). It seems that the daily dose of estradiol stimulates the egg production than the other hormonal treatments (Table 2), otherwise the weekly hormonal dose improve either egg number or egg mass. It seems also that large doses of thyroxine and ACTH (once a week) may improve egg number or egg mass compared with the daily doses of these hormones. In this respect, Van Tienhoven

TABLE 4. **Clutch size for the different groups of treated Fayoumi layers during the experimental period.**

Treatment	Dose		Average	No. of birds
	Weekly	Daily		
Thyroxine	1.47 ± 0.12	1.21 ± 0.06	1.34 ± 0.074 [a]	29
Estradiol	1.64 ± 0.11	1.78 ± 0.16	1.713± 0.10	30
ACTH	1.73 ± 0.15	1.51 ± 0.09	1.62 ± 0.91	28
Control	1.47 ± 0.15	1.82 ± 0.15	1.65 ± 0.111	27

a: Mean differ significantly from each others at $P < 0.01$

(1961), and Etches and Cunningham (1976) found that large doses of ACTH induced ovulation in hens. It is clear from Tables 1 and 2 that there was a weekly decline in the number of the eggs and/or the egg mass produced by different treatments as the experiment progressed except for the second week (Period) which in general, was significantly higher ($P<0.01$) than other periods (Table 3).

From the present results, it could be concluded that the thyroxine treatment caused a decline in egg production at the summer time. This conclusion is in agreement with Hutt and Gowe, (1948), Godfrey (1949), and Berg and Bearse (1951). However, this conclusion is disagreement with Turner *et al.*, (1945 a and b), and Turner and Kempster (1947). The reasons for the contradiction between the said reports may be due to the type of applying the thyroxine and the age of the hens.

b) Egg weight

The average of the egg weight for the different periods, doses and treatments are presented in Table 5. The only significant difference was found either between treatments or between doses (Table 3). On the contrary to the egg number, the thyroxine treatment had higher values ($P < 0.01$) than the control or the other hormonal treatments. This increase in egg weight may be due to the improvement in the metabolic processes by direct stimulatory effect of thyroxine, or the improvement in egg shell thickness. In this respect, Gutteridge and Novikoff (1947), Hoffman and Wheeler (1948), Berg and Bearse, (1951) and Oloufa (1953) found that thyroid hormones activate the shell glands and favour the formation of egg shell. However, other investigators (Turner *et al.*, 1945 a, and Turner 1948 b) pointed out that feeding the thyroprotein had no effect on the weight of the eggs. On the other hand, egg weight increased ($P<0.05$) by estradiol treatment over control (Table 5). Also egg weight of ACTH exceeds that of control.

TABLE 5. **Effect of weekly or daily dose for the different hormones at 4 periods of summer on egg weight of Fayoumi layers (in grams).**

Treatments	Group	Period 1 Mean±S.E.	Period 2 Mean±S.E.	Period 3 Mean±S.E.	Period 4 Mean±S.E.	General mean Mean±S.E.
Thyroxine	weekly	44.54±1.02	44.64±0.88	44.49±1.08	42.98±1.28	44.16±0.51
	Daily	45.30±0.76	45.3±1.07	44.54±0.97	45.04±0.98	45.05±0.51
	Average	44.92±0.62	44.97±0.68	44.51±0.72	44.01±0.83	44.60±0.35
Estradiol	weekly	39.65±1.58	42.86±0.96	40.67±1.39	42.31±0.93	41.37±0.61
	Daily	43.23±0.94	43.55±0.86	43.80±0.69	44.28±0.90	43.72±0.42 b
	Average	41.44±0.85	43.20±0.63	42.23±0.78	43.29±0.63	42.54±0.37
A.C.T.H.	weekly	41.38±0.74	42.05±0.76	40.45±1.18	41.43±0.68	41.33±0.42
	daily	41.82±1.13	43.47±1.04	42.41±1.66	41.48±1.19	42.3 ±0.62 ab
	Average	41.60±0.65	42.76±0.64	41.43±0.96	41.45±0.57	41.81±0.36
Control	weekly	41.42±0.84	42.15±0.59	40.38±0.64	42.14±1.04	41.52±0.38
	Daily	40.92±0.77	39.16±3.07	42.08±0.87	42.85±1.00	41.25±0.90 a
	Average	41.17±0.55	40.65±1.65	41.23±0.63	42.49±0.71	41.38±0.54
General mean	weekly	41.76±0.59	42.98±0.43	41.64±0.67	42.23±0.49	42.17±0.2
	Daily	42.93±0.51	42.88±0.91	43.14±0.51	43.58±0.53	43.09±0.34
	Average	42.34±0.35	42.93±0.48	42.39±0.39	42.92±0.34	42.63±0.22

General means followed by the same letter do not differ significantly from each other at $P < 0.05$.

It could be recommended from the results obtained in this study that the daily doses of hormones improves egg weight. This is because the difference betweeu daily and weekly doses was significant (Table 3). The data failed to show any difference between periods, however, insignificant increase in egg weight occurred for estradiol and ACTH.

c) *Egg specific gravity*

The specific gravity of the eggs (Table 6) of the thyroxine group was less than the other treatments and the differences were significant ($P < 0.01$) as shown in Table 3. This finding agreed well with the data obtained for the egg

TABLE 6. Effect of weekly or daily dose for the different hormones at 4 periods of summer on egg specific gravity of Fayoumi layers.

Treatments	Group	Period 1 Mean ± S.E.	Period 2 Mean ± S.E.	Period 3 Mean ± S.E.	Period 4 Mean ± S.E.	General mean Mean ± S.E.
Thyroxine	Weekly	1.087 ± 0.0055	1.078 ± 0.0025	1.060 ± 0.0037	1.082 ± 0.0051	1.076 ± 0.0025
	Daily	1.088 ± 0.0048	1.080 ± 0.0046	1.060 ± 0.0025	1.090 ± 0.0044	1.079 ± 0.0023
	Average	1.087 ± 0.0035	1.079 ± 0.0017	1.060 ± 0.0024	1.086 ± 0.0035	1.078 ± 0.0017
Estradiol	Weekly	1.092 ± 0.0057	1.078 ± 0.0033	1.071 ± 0.0027	1.094 ± 0.0014	1.083 ± 0.0022
	Daily	1.083 ± 0.0060	1.083 ± 0.0019	1.067 ± 0.0030	1.088 ± 0.0022	1.080 ± 0.0022
	Average	1.087 ± 0.0042	1.080 ± 0.0019	1.069 ± 0.0020	1.090 ± 0.0013	1.082 ± 0.0015[b]
A.C.T.H.	Weekly	1.084 ± 0.0048	1.080 ± 0.0040	1.070 ± 0.0045	1.090 ± 0.0031	1.081 ± 0.0023
	Daily	1.099 ± 0.0032	1.076 ± 0.0034	1.070 ± 0.0043	1.097 ± 0.0028	1.085 ± 0.0027
	Average	1.090 ± 0.0028	1.078 ± 0.0026	1.070 ± 0.0030	1.093 ± 0.0024	1.083 ± 0.0018[ab]
Control	Weekly	1.091 ± 0.0061	1.086 ± 0.0026	1.072 ± 0.0020	1.091 ± 0.0040	1.085 ± 0.0024
	Daily	1.098 ± 0.0044	1.085 ± 0.0019	1.072 ± 0.0023	1.095 ± 0.0024	1.087 ± 0.0020
	Average	1.094 ± 0.0036	1.085 ± 0.0016	1.072 ± 0.0018	1.093 ± 0.0021	1.086 ± 0.0016[a]
General mean	Weekly	1.089 ± 0.0027	1.080 ± 0.0015	1.068 ± 0.0020	1.090 ± 0.0007	1.082 ± 0.0011
	Daily	1.092 ± 0.0026	1.081 ± 0.0014	1.070 ± 0.0015	1.092 ± 0.0027	1.083 ± 0.0012
	Average	1.091 ± 0.0019[b]	1.081 ± 0.0010	1.069 ± 0.0012	1.091 ± 0.0012[b]	1.083 ± 0.0008

General mean followed by the same letter do not differ significantly from each other at $P<0.05$

TABLE 7. **Effect of egg number of Fayoumi layers on its ovary weight (grams) through different hormonal treatments with weekly and daily doses during the experimental period.**

No. of birds	Treatment Egg No. grades	Thyroxine			Estradiol			A.C.T.H.			Control			Average in grams
		Weekly	Daily	Mean	Weekly	Daily	Mean	Weekly	Daily	Mean	Weekly	Daily	Mean	
54	1—10	26.32 ±4.42	30.54 ±5.00	28.43 ±3.35	18.73 ±4.33	19.45 ±16.05	19.09 ±4.38	24.72 ±5.52	21.93 ±3.57	22.33 ±3.08	17.18 ±5.35	25.05 ±6.65	21.11 ±4.07	25.24
44	11—20	35.76 ±3.15	24.23 ±2.00	29.99 ±1.99	21.00 ±4.25	32.77 ±2.13	26.88 ±2.12	28.07 ±2.13	25.96 ±3.18	27.01 ±1.67	33.73 ±5.85	33.65 ±4.39	33.69 ±1.13	29.39
No. of birds:		13	14	T. 27	13	11	T. 24	14	11	T. 25	9	13	T. 22	

T. = Total

TABLE 8. Mean± S.E. of different parts of female reproductive system of Fayoumi layers for the different groups of hormonal treatments.

Traits	Thyroxine			Estradiol			A.C.T.H.			Control			No.
	Weekly	Daily	Mean	Weekly	Daily	Mean	Weekly	Daily	Mean	Weekly	Daily	Mean	
Ovary weight g.	31.00 ± 3.11	29.04 ± 3.75	30.02 ± 2.40	19.95 ± 2.92	30.50 ± 3.13	24.79 ± 2.36	26.49 ± 2.84	23.82 ±2.60	25.26 ±1.92	25.20 ±5.00	32.26 ±3.39	29.57 ±2.86	99
Oviduct weight g.	27.56 ± 2.02	26.44 ± 2.55	27.00 ± 1.60	24.80 ± 2.22	27.64 ± 2.35	26.10 ± 1.60	25.16 ± 1.86	24.92 ±2.68	25.05 ± 1.55	22.83 ± 3.62	26.65 ±1.35	25.40 ±1.61	99
Ovary/ oviduct	1.154 ± 0.149	1.100 ± 0.09	1.127 ± 0.08	0.770 ± 0.09	1.070 ± 0.060	0.910 ± 0.06	1.020 ± 0.05	0.980 ±0.11	1.000 ±0.03	1.030 ±0.07	1.240 ±0.13	1.169 ±0.08	99
Pigmented parts cm	17.24 ± 0.38	17.95 ± 0.99	17.60 ± 0.52	17.58 ± 0.70	17.93 ± 0.88	17.74 ± 0.54	17.88 ± 0.91	16.99 ±0.96	17.47 ±0.65	15.87 ±1.29	17.86 ±0.69	17.10 ±0.67	99
Non-pigmented parts cm	30.64 ± 1.58	30.75 ± 2.00	30.69 ± 1.25	29.46 ± 0.48	30.17 ± 2.00	29.70 ± 1.27	30.33 ± 1.58	29.60 ±1.49	30.00 ±1.07	25.25 ±2.89	28.65 ±1.43	27.35 ±1.42	99
Pigmented/ Non-pigmen	0.57 ± 0.02	0.58 ± 0.02	0.58 ± 0.01	0.61 ± 0.03	0.60 ± 02	0.61 ± 0.02	0.58 ± 0.02	0.57 ±0.02	0.58 ±0.01	0.65 ±0.05	0.63 ±0.03	0.64 ±0.02	99
Oviduct length cm	47.86 ± 1.73	48.70 ± 2.91	48.29 ± 1.66	46.90 ± 0.60	48.10 ± 2.80	47.45 ± 1.71	48.20 ± 2.39	46.59 ±2.32	47.47 ±1.65	41.12 ±3.95	46.52 ±1.85	44.18 ±1.92	99
No.	14	14		13	11		14	12		8	13		

production. The decrease in specific gravity by thyroxine treatment did not follow the effect of thyroxine on egg weight (Table 5). It appears that egg specific gravity was not associated with egg weight but it may associated with the length of the production (Berg and Bearse, 1947). It is also observed that there was fluctuation in the values of the egg specific gravity with the progress of the experiment. However, for all hormonal treatments, in general, the average of the first and the fourth periods were higher than the other two periods ($P < 0.01$) as shown in Table 3. The observed increase at the fourth period compared with the first period for estradiol and ACTH treatments may be associated with the increase of serum Ca due to estrogens either directly from estradiol or indirectly from ACTH effect, and consequetly the formation of egg shell and protein of its component. Urist *et al.* (1958), demonstrated that a 10 fold increase in serum Ca of roosters injected with estrogen was observed. The increase in blood Ca causes an increase in serum protein. (Simkiss and Taylor 1971).

2. *Reproductive organs*

The weight of the hen's ovary was influenced by the degree of its egg number (Table 7). The differences were only significant ($P < 0.05$) between grades of eggs. The more the egg number, the more increase in the ovary weight (25.24 vs. 29.39 g) as shown in Table 7. However, hormonal treatments and/or doses had no effect. This may be due to the fact that the measurements were taken after the end of the experiment, where there is no effect of the hormones. In oviducts parameters (Table 8), the control group was less in most of them than that the hormonal treatments, where the subgroups (daily or weekly) failed to have unique trend in this respect. The weightl of the ovary and the oviduct increased rapidely when the hen changes its reproductive phase from rest to laying conditions. Breed used for egg production posses more visible oocytes in ovary and consequently higher ovary weight than nonlayers or meat breeds. It is possible that the increase in weight in both ovary and oviduct are related to hormonal mechanism or levels. The ratio (ovary wt/oviduct wt) in Fayoumi breed is unity (Hafez and Kamar, 1955) and is higher than that found in other breeds (Chaikoff *et al.*, 1941). The thyroxine treatment has larger ovaries and oviducts than other treatments. Therefore, the rapid increase in the ovary and in the oviduct weights is a metabolic process rather than reproductive one. Also, the length of the oviduct is larger during laying capacity than during the rest. All the hormonal treatments showed larger lengths of oviducts than that the control.

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تأثير الثيروكسين والاستراديول والهرمونات المنشطة لغـــدد فوق الكليتين على صفات البيض وبعض الأعضاء التناسلية فى الفيومى ٠

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استخدام لهذا البحث ١٢٠ دجاجة فيومى فى موسمها الانتاجى الاول وقسمت الى أربعة مجاميع ٠ ثلاثة منها للمعاملات الهرمونية (الثيروكسين – الاستراديول والهرمونات المنشطة لغدد فوق الكلية) بينما المجموعة الرابعة للمقارنة ٠ كذلك قسمت كل مجموعة الى تحت مجموعتين لاعطاء الجرعة الهرمونية اما يوميا (جرعة صغيرة) أو اسبوعيا (جرعة مضاعفة ٧ مرات) واستمرت التجربة شهرا كاملا أثناء الصيف كانت تعطى فيها المعاملات السابقة فى الاسبوع الاول والثالث فقط – كذلك سجل وزن البيض وكثافته يوميا وفى نهاية التجربة ذبحت الطيور وتم وزن البيض وقناة المبيض وأخذت أطوال قناة المبيض (الجزء المصبوغ والغير مصبوغ) وكانت أهم النتائج المتحصل عليها كما يلى : –

١ – أدت المعاملة بالثيروكسين الى زيادة معنوية فى وزن البيض عن المعاملات الهرمونية الأخرى فى حين أن المعاملة بالثيروكسين قللت من عدد البيض وكتلته وكثافته بينما حسنت المعاملات الهرمونية الأخرى عدد البيض وكتلته معنويا عن المعاملة بالثيروكسين ٠

٢ – كذلك كان لتأثير الجرعة اليومية زيادة معنوية فى وزن البيض ٠

٣ – تداخل الجرعة مع المعاملات الهرمونية لها تأثير معنوى فى زيادة عدد البيض وكتلته بحيث كانت الجرعة اليومية للاستراديول أكبر من المعاملات الأخرى فى حين كانت الجرعة الأسبوعية لباقى المعاملات الهرمونية أكثر فى عدد البيض وكتلته ٠

٤ – تحسين عدد البيض وكتلته فى الاسبوع الثانى للمعاملات الهرمونية وكانت الزيادة معنوية عن الاسابيع الاخرى ٠

٥ – كان وزن البيض وقناة المبيض للطيور ذات الانتاج العالى أعلا من الانتاج الأقل ٠ كذلك كان طول قناة المبيض للطيور المعاملة بالهرمونات أعلى من **الطيور المقارنة ٠**