PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF GOLDEN MONTAZAH AND MATROUH CHICKENS AS AFFECTED BY SOME LIGHHT COLOURS

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Abstract

The aim of the present experiment is to study the effect of strain (Golden Montazah and Matrouh) and light colour (green, white and incandescent) and interaction between them on the performance during the growing and laying periods. At 12 weeks of age, a total of 270 chicks and 45 cockerels (decreased to 27 cockerels at 20 weeks of age) for each strain, were used in the present study. All pullets were individually leg-banded and divided into three groups of each strain. Each group consisted of 90 pullets and 15 cockerels distributed into 3 replicates of 30 pullets and 5 cockerels. The groups of chicks were assigned at random to be reared during experimental period (from 12 to 44 weeks of age) under one of three light colour treatments, being (green or white fluorescent and incandescent).

The obtained results can be summarized as follows:

Rearing period

The Golden Montazah pullets were significantly higher than those of Matrouh ones in live body weight, body weight gain, and feed consumption from 12 to 20 weeks of age. However, the opposite trend was detected for Matrouh strain which showed the higher values of feed conversion ratio from 12 to 20 weeks of age than those of Golden Montazah strain.

The birds exposed to the green light were the best in respect of live body weight, body weight gain and feed conversion ratio. However, the birds exposed to white light consumed obviously the biggest amount of feed at the intervals 12-20 weeks of age followed by those kept under incandescent and green lights in a descending order.

Laying period

The Golden Montazah birds secured significantly higher means than Matrouh ones in live body weight, feed consumption and egg number. However, the opposite trend was recorded for Matrouh strain which showed the higher values of age at different rates of egg production, feed conversion ratio, egg weight, fertility and hatchability at 42 weeks of age.

The birds exposed to the green light recorded the highest values in respect of age at different rates of egg production, live body weight, feed conversion ratio, egg weight and hatchability. However, the birds exposed to white light were the best in respect of egg number and fertility than other colours.

Interactions between strain and light colour in all traits under study were significant at the whole experimental period from 12 to 44 weeks of age.

INTRODUCTION

The influence of the kind of light is one of the important factors affecting poultry production, also, the light colour was one of the environmental changes that increasingly developed as change in materials used in poultry farm. Recently, many poultry breeders have changed from incandescent lamps to more energy efficient and longer lasting sources of light such as fluorescent which produces up to the number of lumens per watt and the lamp life of fluorescent lamps are 4 and 20 times, respectively, more than that of incandescent lamp.

Prayitno *et al.* (1997) suggested that the perception of long wavelength light by the pineal gland is central to the effect on activity. Benoit (1964) reported that, only longer wavelengths of visible radiation are able to penetrate to the hypothalamus, where as, others are completely absorbed by the tissues of the eyeball. This increase in penetration effects on activity for mate seeking is an essential part of reproductive development in many poultry.

Local strains of chickens have the advantage of good adaptation to local environment and natural genetic resistance to some serious diseases such as Marek's. Also, a lot of people still prefer the taste of meat and eggs of local chickens. This was the main of the Golden Montazah and Matrouh local strains under study.

The aim of the present experiment is to study the effects of strain (Golden Montazah and Matrouh) and light colour (green, white and incandescent) and the interaction between them on the productive and reproductive performance during the growing and laying periods.

MATERIALS AND METHODS

The present study was conducted at Anshas Poultry Breeding Farm, Animal Production Research Institute, Dokki, Egypt.

This study was designed to investigate the effects of some light colours on the productive and reproductive performance of two local developed strains (Golden Montazah and Matrouh) of chickens during the growing and laying periods.

Flock management

At 12 weeks of age, a total of 270 pullets and 45 cockerels (decreased to 27 cockerels at 20 weeks of age) for each strain were used in the present study.

All pullets were individually leg-banded and divided into three groups of each strain. Each group consisted of 90 pullets and 15 cockerels distributed into 3 replicates of 30 pullets and 5 cockerels. The groups of chicks were assigned at random to be reared during experimental period (from 12 to 44 weeks of age) under one of three

light colour treatments, being (green or white fluorescent and incandescent). The pullets of each treatment for each strain were divided into three replicates. Each replicate was housed in separated floor pens (185 X 320 cm). The pullets were reared on the floor and supplied with green, white fluorescent lamps and incandescent lamp. Light treatments were equalized for light intensity (106, 110.5 and 108.5 1x for green, white and incandescent lights, respectively). Light intensity estimated by Digital Illumination Meter, with a lamp put at the middle of the pen from 12 to 40 weeks of age. The height of lamp was 2.10 meter from the floor and the lamps were cleaned every day. The grower diet contained 15.01% C.P and 2690 kcal ME / kg feed from 12 to 20 weeks of age and a laying diet contained 15.48 C.P and 2746 kcal ME / kg feed from 20 to 44 weeks of age (Table 1).

Lighting program

The daily lighting period reached 14 hours at 12 weeks of age, then, it decreased by two hours every week until 15 weeks of age. At the 16 week of age, daily light period was increased by one hour weekly until reached 16 hours and 8 hours darkness at the 23 week of age. The windows were covered by black sheets.

Table 1. Composition of the experimental diets and the chemical analysis used in this study.

Ingredients	Experimental diets	
	Grower	Layer
	12-20 weeks	21-44 weeks
Yellow corm	36.00	66.00
Soybean meal (44%)	15.50	21.30
Wheat bran	17.78	2.94
Dicalcium phosphate	1.25	1.50
Calcium carbonate (CaCo3)	1.80	7.60
Sodium chloride (NaCl)	0.30	0.30
D.L. Methionin	0.07	0.06
1) Vit. And mineral mixture	0.30	0.30
Total	100	100
Chemical analysis		
EE,%	3.05	2.77
CF,%	4.43	3.27
Ca,%	1.04	3.30
Available P,%	0.34	0.37
Lys.	0.69	0.76
Meth	0.32	0.32
Meth + Cys	0.59	0.59
Crude protein %	15.01	15.48
ME (k..cal/Kg)	2690	2726

Each KG. of vitamin and mineral mixture

(1) Vitamin mixture: Supplements / Kg diet

Vit. A 1200 I.U, Vit. E 20 mg., mg., Vit. B1 2mg., Vit. B 2mg., Vit. B6 3mg., Vit. B12 20mg., Choline 1000 mg., Vit. D3 3000 I. U, Vit. K 3mg., Nicotinic Acid 40 mg., Pantothenic acid 12 mg., Folic acid 1.5 mg. Biotin 75 mg.

(2) Mineral mixture: Supplements/Kg diet.

Mn 100 mg., Fe 40 mg., Co 0.10 mg., Se 0.10 mg., Zn 60 mg., Cu 5 mg., 10.5 mg.

Studied traits

The studied traits were as follows:

Rearing period

The studied traits were live body weight, body weight gain, feed consumption and feed conversion ratio. These traits were measured during the experimental period from 12 to 20 weeks of age on 4-week interval basis.

Laying period

The laying period was studied from 20 to 44 weeks of age for 90 hens/ strain / treatment and the studied traits were: Age at 20%, 50%, and the peak of egg production were recorded for each strain and each treatment, body weights in grams were recorded at 44 weeks of age, feed consumption (g. diet/ bird/ 4- weeks) was recorded every 4 weeks from 20 to 44 weeks of age, feed conversion (g. diet / g. eggs) was calculated for each replicate every 4 weeks of the laying period, egg number / hen was calculated every 4 weeks (20-44 weeks of age) and during the first 90 days of egg production for each replicate, average egg weight in grams was recorded daily for the experimental treatments, and calculated every 4 weeks (20-44 weeks of age) and during the first 90 days of production. At the 39 weeks of age, 560 eggs of Golden Montazah and 372 eggs of Matrouh layers were resent. Hatchability was calculated as a percentage of fertile eggs or of total eggs set.

Statistical analysis

Data were statistically analyzed by General Linear Models (GLM) procedure as described for statistical analysis of SAS user guide (1996) using two way ANOVA. The statistical model used was:

$Yijk = \mu + Si + Lj + SLij + eijk$

Where : μ = population mean, Si = strain effect (i=1 and 2), Lj=light colour effect (j=1,2 and 3), SLij = the interaction between strain and light colour (ij=1,2, ...,6) and eijk = random error.

RESULTS AND DISCUSSION

Rearing Period

1. 1. Live body weight and live body weight gain of unsexed

Effect of strain

Table 2 shows that the two strains had nearly similar live weight at 12 week of age, the Golden Montazah birds were significantly ($p \leq 0.01$) heavier than Matrouh ones at 16 and 20 weeks old by about 2.8 and 2.6%, respectively.

The accumulative values of body weight gain of Golden Montazah birds from 12-20 weeks were siginificantly ($p<0.01$) higher than those of Matrouh strain ones by about 6.8%.

These results agree with those of Mahmoud *et al.* (1974b) and El- soudany (2003). They indicated that live body weigth was not influenced by strains at 12 weeks of age. Sailer (1985) reported that the variation in body weight among strains could be attributed to their genetic variation, which affected their growing potential capacity .

Effect of light colour

The light colour had no significant effects on live body weight at 12 and 16 weeks of age, where the birds exposed to the three light colour approximately recorded equal values of live body weight. However, the birds exposed to the green light were heavier than those of white and incandescent ligts at 20 weeks of age by 2.3 and 2.8 %, respectively (Table 2).

The body weight gains of birds exposed to the three light colour were nearly similar at the intervals 12-16 weeks. Meanwhile, those birds exposed to green light significantly ($P\leq0.01$) recorded better weight gain by about 14.1 and 21.0 % at 16-20 weeks and 5.7 and 6.1 % at 12-20 weeks of age when compared with birds exposed to the white and incandescent lights, respectively (Table 2).

These results agree with those reported by Prayitno *et al.* (1997) who observed that the birds reared under white light were more active than those under green light. They also found increase in body weights and feed efficiency of those reared under green light (short wavelength).

The interactions between strain and light colour in respect to live body weight were significant at 20 weeks of age, while, those interactions were significant in respect to weight gain at 16-20 weeks.

1.2. Feed consumption

Effect of strain

Table 2 indicates that the Golden Montazah consumed more feed during the interval 12-16 weeks than Matrouh ones by about 14.2%. Differences in feed consumption due to the Matrouh ones by about 12-20 weeks of age were significant ($P\leq0.01$). These results agree with those reported by Raya *et al.* (1990) who found significant differences in feed consumption at 20 weeks of ages between Dokki-4 and R. I. R. birds.

Effect of light colour

Difference in feed consumption at the rearing period from 12-20 weeks of age due to the effect of light colour were significant ($P\leq0.01$) (Table 2). The superiority of white light than incandescent and green light in feed consumption at the whole interval

12-20 reached about. 10.5 and 15.7%, respectively. Hill *et al.* (1988) found that high feed consumption by birds reared under fluorescent light compared with those under incandescent light, may be due to that extra food was compused by the flourescent light due to a requirement for energy created by a higher level of physical activity. El-Abd (1996) found that, the chicks exposed to the red light consumed significantly ($P \leq 0.01$) more feed / day than those under blue or white lights at 20 weeks of age.

The interactions between strain and light colour during the rearing period from 12 to 20 weeks of age were significant ($p \leq 0.01$).

1.3. Feed conversion (Kg feed/ Kg weight gain)

Effect of strain

The averages of feed conversion ratio of strain and light colour are presented in Table 2. The Golden Montazah birds were significantly ($P \leq 0.01$) better than those of Matrouh ones at 12-20 weeks of age in feed conversion ratio by about 5.6%. The feed conversion was significantly affected by strain of chickens during the rearing period as reported by Raya *et al.* (1990) on Dokki-4 and R.I.R

Effect of light colour

The light colour had significant ($p \leq 0.01$) effect on feed conversion value at the rearing period. The birds exposed to green light were the best in respect of feed conversion ratio at the interval 12-20 weeks of age followed by those kept under incandescent and white light in a descending order. The light colour had significant effects on feed conversion during the growing and rearing period as reported by El-Abd (1996).

Interactions between strain and light colour in respect of feed conversion ratio were significant ($p \leq 0.01$) at all intervals from 12 to 20 weeks of age.

2. Laying period

2.1. Age at different rates of egg production

Effect of strain

The results of age at different rates of egg production are presented in Table 3. The Golden Montazah hens significantly ($p \leq 0.01$) reached 20 and 50% egg production earlier than those of Matrouh by 2.2 and 5.8 days, respectively. Similarly, the peak of egg production was recorded for Golden Montazah hens earlier than Matrouh ones by about 3.1 days with significant ($p \leq 0.01$) differences.

Mahmoud *et al.* (1974 a,b), and El-Soudany (2000) found no significant differences between Golden Montazah and Matrouh strains in age at sexual maturity.

Table 2. Effect of strain and light colours on body weights (g), body weight gain (g), feed consumption (g/brid/interval) and feed conversion ratio (g feed/g weight gain) of unsexed birds during rearing period.

Main factors	Live body weight (g) at Different ages (weeks)			BW gain	F.C	F.C.R
	12	16	20	12-20	12-20	12-20
Strains (A)						
Golden Montazah (GM)	784.1	1141.1	1342.9	558.81	3966.3	7.11
Matrouh (Mt)	786.3	1110.6	1309.4	523.11	3910.9	7.55
SEM	1.42	5.19	5.32	5.39	8.92	0.08
Significant level	Ns	**	**	**	**	**
Light colors (B)						
Green (G)	786.8	1126.4	1348.5[a]	561.68 [a]	3687.3 [c]	6.57 [c]
White (W)	786.7	1123.7	1318.4 [b]	531.65 [b]	4266.5 [a]	6.12 [a]
Incandescent (I)	782.1	1128.2	1311.7 [b]	529.55 [b]	3862.0 [b]	5.31 [b]
SEM	1.74	6.36	6.56	6.60	10.93	0.09
Significant level	Ns	Ns	**	**	**	**
Interaction (AXB)						
GM X G	785.8	1127.9	1347.6	561.77	3691.9	6.57
GM X W	786.5	1148.3	1374.9	588.43	4255.0	7.23
GM X I	779.9	1148.5	1306.2	526..23	3951.8	7.53
Mt X G	787.7	1124.9	1349.3	561.60	3682.6	6.56
Mt X W	786.9	1099.2	1261.8	474.87	4278.1	9.01
Mt X I	784.3	1107.8	1317.1	532.87	3772.2	7.08
SEM	2.46	8.99	9.22	9.33	15.45	0.13
Significant level	Ns	Ns	**	**	**	**

ab: Means within each column within each trait have no similar letter(s) are significantly different at p>0.05

Effect of light colour

The hens exposed to the green light reached 20 and 50% egg production as well as the peak of production significant ($p \leq 0.01$) later than those exposed to the white and incandescent lights by about 3.3, 7.2 and 8.4 days, respectively. It must be mentioned that the hens exposed to white and incandescent lights reached the different rates of production nearly at the same time.

The light colour had no significant effects on ege at first egg as reported by Felts *et al.* 1992.

The interactions between strain and light colour in respect to age at 10,20 and 50% egg production as well as the peak of production were significant ($p \leq 0.05$ or $p \leq 0.01$).

2.2 Live body weight

Effect of strain

Table 6 shows significant strain differences in body weight at 50% and at 44 weeks of age. Similarly, Golden Montazah birds were significantly ($p \leq 0.01$) heavier

than those of Matrouh at peak and at the end of the study (44 weeks of age). El-soudany (2000) came to the same conclusion for local strains.

Effect of light colour

The birds exposed to all colour groups had nearly similar values of body weight at 50% of egg production, meanwhile, at 44 weeks of age, birds exposed to incandescent light recorded the most light body weight among all colours groups with significant ($p \leq 0.01$) differences at (44 weeks of age).

EI-Abd (1996) obtained no significant effects of light colour and live body weight. On the other hand, Ibrahim (2004) reported that light colour had significant effects on live body weight of Mamourah strains.

Interactions between strain and light colour were significant ($p \leq 0.05$ or $p \leq 0.01$) concerning live body weight only at 10%,20% of egg production at 20-44 weeks of age.

2.3. Feed consumbtion

Effect of strain

Table 3 indicates that the golden montazah birds surpassed Matrouh ones in feed consumption by about 1.66%.differences ones in feed consumption due to the effect of strain at the whole interval studied was significant ($p<0.01$). These results agree with those reported by EI-Sheikh (2005) who found no significant differences in feed consumption during laying period of Gimmizah and Bandarah layers .

Effect of light colour

The feed consumption birds exposed to the three light colours was nearly similar at the whole experimental period (22-44 weeks of age). EI-Abd (1996) found significant effects of colour treatment in Rhode Island Red hens with respect to feed consumption at the laying period.

Interactions between strain and light colour in respect of feed consumption were significant ($p \leq 0.01$) at all studied intervals except 20-24 weeks of age.

2. 4. Feed conversion ratio (g feed/g egg) .

Effect of strain

The averages of feed conversion ratio of strain and light colour are presented in Table 3. The Golden Montazah birds were significantly ($p<0.01$) better than Matrouh ones at 20-44 weeks of age with respect to feed conversion ratio by about 3.81%.

El-Full *et al.* (2005) found significant differences in feed conversion during laying period of nine Egyptian strains (Dondatawi, Fayoumy, Sinai, Bahig, Golden Montazah, Inshas, Mandarah, Matrouh and El-Salam).

Effect of light colour

The differences in feed conversion due to light colour (green, white and incandescent) at all laying period were significant ($p<0.01$), the superiority of incandescent light than white and green light in this respect at the whole experimental period 20-24 weeks of age reached about 0.84 and 8.56% respectively, with significant differences between incandescent and green lights.

These results agree with those found by El-Abd (1996) who found that the effect of light colour (white, blue and red) in feed conversion of laying hens from 24-64 weeks of age has not any consistent effect, however, while Ibrahim (2004) showed that hens which received fluorescent light were significantly better in feed conversion per eggs than those that received incandescent light.

The interactions between strain and light colour in respect of feed conversion were significant ($p<0.01$) at all periods of study except at the interval 40-44 weeks of age which was significant ($p<0.05$) .

Table 3. Effect of strains and light colours on age (days) at 20%, 50% and peak of egg production, body weight, feed consumption (g/hen/4 weeks) and feed conversion ratio (kg feed /kg eggs) during laying period.

Trait	Age (days)			Body weight		F.C	F.C.R
Main factors	20%	50%	peak	50%	At 44 wks	20-44 wks	20-44 wks
Strains (A)							
Golden Montazah (GM)	160.33	177.78	200.33	1468.1	1620.8	17835	6.03
Matrouh (Mt)	162.50	183.56	203.44	1422.5	1523.2	17540	6.26
SEM	0.27	0.32	0.35	9.66	12.56	187.89	0.044
Significant level	**	**	**	**	**	**	**
Light colours (B)							
Green (G)	163.67^{a}	185.50^{a}	207.50^{a}	1443.5	1594.7^{a}	17676	6.47^{a}
White (W)	160.50^{b}	178.67^{b}	199.00^{b}	1463.1	1594.9^{a}	17750	6.01^{b}
Incandescent (I)	160.17^{b}	177.83^{b}	199.17^{b}	1429.4	1526.5^{b}	17636	5.96^{b}
SEM	0.33	0.40	0.43	11.82	15.39	230.1	0.053
Significant level	**	**	**	Ns	**	Ns	**
Interaction (AXB)							
GM X G	161.67	183.67	207.67	1459.9	1609.1	17702	6.33
GM X W	158.67	174.67	195.33	1487.9	1684.3	17369	5.55
GM X I	160.67	175.00	198.00	1456.6	1569.1	18436	6.22
Mt X I	165.67	187.33	207.33	1427.0	1580.2	17650	6.61
Mt X G	162.33	182.67	202.67	1438.3	1505.6	18133	6.46
Mt X W	159.67	180.67	200.33	1402.3	1484.0	16837	5.70
SEM	0.47	0.56	0.61	16.70	21.76	60.59	0.075
Significant level	**	**	**	Ns	**	**	**

abc: Means within each column within each trait have no similar letter(s) are significantly different at $p>0.05$

2. 5. Egg number

Effect of strain

The resultus of egg number are presented in Table 4. Egg number recorded for Golden Montazah pullets was significantly better than that of Matrouh ones at the intervals 20-24, 24-28, 28-32, 32-36 and 36-40 weeks of egg by about 4.47, 8.07, 15.50, 8.08 and 4.83%, respectively. Similarly, at the first 90 days of egg production and the accumulative value of egg number of Golden Montazah, birds at 20-44 weeks were significantly ($P \leq 0.01$) higher than those of Matrouh by about 11.64 and 8.18%, respectively. This superiority decreased to about 4.06% at the interval 40-44 weeks of age, with no significant breed differences.

El-Soudany (2000) reported that egg number during first 90 days of egg production of Golden Montazah strain was higher than that of Matrouh strain which may be due to high resistance of Golden Montazah to environmental condition in Anshas area than Matrouh strain or to intensive selection plants to this strain.

Effect of light colour

The birds exposed to the white light were the best in respect to egg number at the intervals 24-28, 28-32 and 32-36 weeks of age, followed by those of incandescent and green lights. The superiority of white light than incandescent and green light in this respect at the whole interval 20-44 weeks of age reached about 1.09 and 9.84% respectively, however, the opposite was incandescent light for best egg number at the following intervals 20-24 and 40-44 weeks of age. Differences in egg number due to the effect of light colour at all intervals studied were significant ($P \leq 0.01$). These results were confirmed by those reported by (Felts *et al*. 1992) who noticed that hen-housed egg production significantly higher for females exposed to sodium vapour and fluorescent lights versus incandescent light of turkey hens. Ibrahim (2004) found that the hens reared under fluorescent light were significantly better in egg number and hen/day/egg production at 52 weeks of age than those reared under incandescent light.

Interaction effects between strain and light colour at all laying periods were significant ($P \leq 0.01$) except at interval 40-44 weeks of age.

2.6 egg weight

Effect of strain

Table 5 shows that the Matrouh birds were significantly ($p \leq 0.01$) heavier than those of Golden Montazah ones at all intervals studied when the data were pooled at the peak of egg production or at 20-44 weeks of age, the Matrouh hens surpassed golden montazah ones in egg weight by about equal 1.12% these results agree with EL- soudany (2000, 2003) who reported that matrouh strains was superior to Golden

Montazah with respect to average egg weight during the first 90 days of egg production.

Table 4. Effect of strains and light colours on egg number (egg/ hen / 4 weeks) at different intervals of age.

Trait	Egg number at different intervals (weeks) of age							
Main factors	20-24	24-28	28-32	32-36	36-40	40-44	20-44	At first 90 days of production
Strains (A)	4.21	13.66	15.72	13.64	12.36	11.28	70.88	37.60
Golden Montazah (GM)	4.03	12.64	13.61	12.62	11.79	10.84	65.52	33.68
Matrouh (Mt)	0.12	0.12	0.11	0.19	0.13	0.22	0.33	0.06
SEM								
Significant level	**	**	**	**	Ns	**	**	**
Light colors (B)								
Green (G)	3.78^{b}	12.44^{b}	14.15^{c}	12.66^{c}	11.01^{b}	10.21^{b}	64.24^{b}	34.37^{b}
White (W)	4.21^{a}	13.56^{a}	15.10^{a}	13.73^{a}	12.70^{a}	11.26^{a}	70.56^{a}	36.33^{a}
Incandescent (I)	4.36^{a}	13.45^{a}	14.75^{b}	12.99^{b}	12.52^{a}	11.72^{a}	69.80^{a}	36.23^{a}
SEM	0.14	0.15	1.13	0.23	0.16	0.27	0.40	0.07
Significant level	**	**	**	**	**	**	**	**
Interaction (AXB)								
GM X G	4.00	13.36	15.00	13.12	11.57	10.32	67.38	36.87
GM X W	4.56	13.82	16.46	14.82	13.14	11.76	74.56	38.52
GM X I	4.07	13.79	15.73	12.98	12.38	11.76	70.69	37.42
Mt X I	3.56	11.51	13.30	12.21	10.44	10.09	61.10	31.88
Mt X G	3.86	13.30	13.74	12.64	12.26	10.75	66.56	34.13
Mt X W	4.67	13.12	13.78	13.01	12.66	11.67	68.91	35.05
SEM	0.09	0.08	0.12	0.15	0.12	0.38	0.56	0.10
Significant level	**	**	**	**	**	Ns	**	**

abc: Means within each column within each trait have no similar letter(s) are significantly different at p>0.05

Effect of light colour

The pullets exposed to the white and incandescent lights had nearly similar values of egg weight at 20-24, 32-36, 36-40. weeks of age, as well as at the peak and at the first 90 days of egg production meanwhile the egg weight at the intervals was significantly ($P \leq 0.01$) heavier in green light than those of white and incandescent light except at the interval 20-24 weeks. These results agree with El-Abd (1996) who found that light colours improved egg weight of chicken.

Interactions between strain and light colour were highly significant ($P \leq 0.01$) in egg weight at all periods of study except at 50% of egg production and during the first 90 days of egg production.

2. 7. Fertility and hatchability percentages

Effect of strain

Table 6 indicates that the Matrouth birds were significantly ($P \leq 0.01$) better than Golden Montazah ones in fertility and hatchability percentages of fertile eggs or of all eggs at 42 weeks of age by about 3.95, 36.41 and 41.83%, respectively. Similar results of fertility percent was observed by El-Soudany (2003) who reported that fertility and hatchability of Matrouh strain were higher than those of Golden Montazah

strain. However, Mahmoud *et al.* (1974a) showed that the apparent superiority of Matrouh strain might be due to the effect of selection for hatchability.

Table 5. Effect of strains and light colours on egg weight (gm) at different intervals of age.

Trait	Egg weight (gm) at different intervals (weeks) of age						
Main factors	20-24	24-28	28-32	32-36	36-40	40-44	During first 90 Days of age
Strains (A)							
Golden Montazah (GM)	32.37	41.94	42.95	44.20	45.09	45.96	39.28
Montazah (Mt)	33.04	42.62	43.79	45.14	46.22	46.73	39.87
SEM	0.096	0.547	0.051	0.066	0.053	0.074	0.060
Significant level	**	**	**	**	**	**	**
Light colours (B)							
Green (G)	32.74	42.62 [a]	43.85 [a]	45.27 [a]	46.42 [a]	47.00 [a]	39.98
White (W)	32.47	42.22 [b]	43.03 [c]	44.46 [b]	45.20 [b]	45.37 [c]	39.33
Incandescent (I)	32.92	41.99 [c]	43.24 [b]	44.29 [b]	45.33 [b]	46.68 [b]	39.42
SEM	0.118	0.067	0.062	0.081	0.064	0.090	0.070
Significant level	Ns	**	**	**	**	**	**
Interaction (AXB)							
GM X G	32.76	42.38	42.99	44.29	45.07	45.99	39.59
GM X W	32.33	42.08	43.09	44.21	45.16	45.61	39.09
Mt X I	32.02	41.35	42.79	44.11	45.03	46.29	39.16
Mt X G	32.71	42.86	44.71	46.25	47.78	48.00	40.37
Mt X W	32.60	42.36	42.97	44.71	45.23	45.12	39.57
Mt X I	33.81	42.63	43.69	44.46	45.64	47.07	39.68
SEM	0.167	0.095	0.087	0.115	0.091	0.127	0.100
Significant level	**	**	**	**	**	**	Ns

abc: Means within each column within each trait have no similar letter(s) are significantly different at p>0.05

Effect of light colour

The birds exposed to the green and white lights had nearly similar values of fertility percent at 42 weeks of age. As well, the birds exposed to green and white lights surpassed incandescent light in fertility percent by about 1.37 and 2.65%, respectively. On the other hand, the birds exposed to green light were the highest in hatchability of fertile eggs at 42 weeks of age, followed by those kept under white and incandescent lights in adescending order. The superiority of green light than white and incandescent lights in respect hatchability of all eggs recorded about 1.92 and 7.54%, respectively. Differences in fertility and hatchability of fertile eggs or all eggs due to the effect of light colour at 42 weeks of age were significant. These results disagree with Felts *et al.* (1992) who obtained no significant differences in fertility of turkey hens at 52 weeks of age due to light colours.

Interactions between strains and light colour in fertility and hatchability of fertile eggs or of all eggs at 42 weeks of age were significant (P<0.01).

Table 6. Effect of strains and light colours on fertility and hatchability at 39 weeks of age.

Trait		Fertility and hatchability.		
Main factors		Fertility	Hatchability of fertile eggs	Hatchability of all eggs
Strains	(A)			
GoldenMontazah	(GM)	90.79	63.39	57.57
Matrouh	(Mt)	94.38	86.47	81.65
SEM		0.077	0.031	0.024
Significant level		**	**	**
Light colours	(B)			
Green	(G)	92.55[a]	76.65[a]	71.74[a]
White	(W)	93.72[a]	74.95[b]	70.39[b]
Incandescent	(I)	91.30[b]	73.18[c]	66.71[c]
SEM		0.054	0.038	0.029
Significant level		**	**	**
Interaction	(AXB)			
GM x G		88.57	60.70	54.10
GM x W		91.70	64.80	59.31
GM x I		91.74	64.60	59.30
Mt x G		96.53	92.60	89.38
Mt x W		95.74	85.10	81.47
Mt x I		90.86	81.70	74.11
SEM		0.077	0.054	0.041
Significant level		**	**	**

abc: Means within each column within each trait have no similar letter(s) are significantly different at p>0.05

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تأثير بعض ألوان الإضاءة على معدل الأداء الإنتاجى والتناسلى لدجاج المنتزة الذهبى ومطروح

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يهدف هذا البحث إلى دراسة تأثر سلالتين من الدجاج هما (المنتزه الذهبى ومطروح) بـبعض ألوان الإضاءة (الأخضر – الأبيض – المتوهج) والتداخل بينهما على معدل الأداء الإنتـاجى خـلال فترتى الرعاية ووضع البيض. استخدم فى هذه الدراسة عدد ٢٧٠ أنثى و ٤٥ ديكا عند ١٢ أسـبوعاً من العمر ثم انخفض عدد الديوك إلى ٢٧ ديكا عند ٢٠ أسبوعاً من العمر وتم ترقيم الإناث فردياً ثم قسمت إلى ٣ مجاميع لكل سلالة وكل مجموعة تحتوى على عدد ٩٠ أنثى و ١٥ ديكـاً والتـى تـم توزيعها عشوائيا إلى ٣ مكررات كل مكررة تحتوى على عدد ٣٠ أنثى و ٥ ديوك . حفظـت كـل المجاميع خلال فترة التجربة من ١٢-٤٤ أسبوعاً من العمر تحت واحد من ثلاث الوان إضاءة هـى (اللون الأبيض أو الأخضر من الفلوريسنت والضوء المتوهج).

– ويمكن تلخيص النتائج المتحصل عليها فى هذه الدراسة كما يلى :

فترة الرعاية:

كانت طيور المنتزة الذهبى أعلى معنوية من طيور مطروح فى وزن الجسم الحى والعائد من وزن الجسم واستهلاك الغذاء فى الفترة من ١٢ – ٢٠ اسبوعاً من العمر ومع ذلك كانت على العكس سلالة مطروح الأعلى قيماً في معدل تحويل الغذاء في نفس الفترة من العمر .

كانت الطيور المعرضة للون الأخضر هي الأفضل في وزن الجسم الحي والعائـد مـن وزن الجسم ومعدل تحويل الغذاء ومع ذلك كانت الطيور المعرضة للون الأبيض هي الأعلي في استهلاك الغذاء ثم التي تعرضت للضوء المتوهج واللون الأخضر علي التوالي في الفترة من ١٢-٢٠ أسبوعاً من العمر.

فترة إنتاج البيض:

كانت دجاجات المنتزة الذهبي الأعلي معنوية من مطروح في وزن الجسم الحـي واسـتهلاك الغذاء وعدد البيض بينما كانت دجاجات مطروح الأعلي قيماً في العمر عند المعدلات المختلفة مـن إنتاج البيض ومعدل تحويل الغذاء ووزن البيض والخصوبة والفقس عند ٤٢ اسبوعاً من العمر.

كانت الطيور المعرضة للون الأخضر الأعلي قيماً في العمر عند المعدلات المختلفة من انتاج البيض ووزن الجسم الحي ومعدل تحويل الغذاء ووزن البيض والفقس بينما تفوقت الطيور المعرضة للـون الأبيض فى عدد البيض والخصوبة .

كان التداخل بين السلالة ولون الاضاءة معنويا في كل الصفات المدروسة في الفترة مـن ١٢-٤٤ أسبوعاً من العمر.