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EFFECT OF TYPE OF LIGHT AND INTENSITY ON PRODUCTIVE PERFORMANCE RATE IN SOME LOCAL STRAINS OF CHICKENS.

By

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Abstract: *This study was conducted to investigate the effect of strains, light treatments and their interactions during the period between 12 and 34 weeks of age on performance of Mandara and Dokki-4 local strains. A total number of 360 birds (divided in to 180 birds for each strain at 12 weeks of age) were used in this study. Four groups from each strain having nearly equal initial live body weights were randomly assigned to 4 treatments. The birds of each treatment for each strain were divided into three replicates (each of 15 pullets). The birds of each treatment for each strain were exposed to one of light treatments: Low intensity (45 Lux) of fluorescent (FL), high intensity (52 Lux) of fluorescent (FH), Low intensity (24 Lux) of incandescent (IL) and high intensity (35 Lux) of incandescent (IH) lights, measured at the level of the birds heads. The results were summarized as follow: Strain had a significant effect on body weights at 20 and 34 weeks of age, body weight gain from 12-20 weeks of age, feed conversion ratio from 26-34 weeks of age, age at 50 %, at the peak of egg production, and egg number at 34 weeks of age in favorite to Mandara strain. Also strain had a significant effect on feed consumption from 26-34 weeks of age and egg weights at the peak of egg production and at 34 weeks of age in favorite to Dokki-4 strain. While, strain had no significant effect on feed consumption and feed conversion ratio from 12-20 weeks of age. The birds exposed to (FL) light treatment significantly recorded better body weights at 20 and 34 weeks of age, body weight gain, feed consumption and feed conversion ratio from 12-20 weeks of age when compared with birds exposed to (FH), (IL) and (IH) light treatments, whereas, the superiority of birds (FH) than birds of (FL), (IL) and (IH) light treatments in feed conversion ratio from 26-34 weeks and egg number at 34 weeks of age. Feed consumption 26-34 weeks of age were decreased significantly by (IL) compared with other light treatments. Meanwhile, the birds exposed to (FH) and (IH) light treatments reached age at 50 % and peak of egg production significantly ($P \leq 0.01$) earlier than those exposed to (FL) and (IL) light treatments. The superiority*

of birds (FH) light treatment than birds of (FL), (IL) and (IH) light treatments in egg weight at 34 weeks of age, with no significant differences between (FH) and (IL) light treatments.

INTRODUCTION

The effect of the light intensity was one of the environmental changes that increasingly developed as change in materials used in poultry farm. The effect of artificial day lengths on the reproductive performance of domestic poultry is well described; A number of investigators have studied the effects of light intensity (Weaver and Siegel 1968; Newberry *et al.,* 1985 and 1988) in chickens, and found that high intensity light increases activity and increases feeding (Prayitno *et al.,* 1997. Light stimuli affects the activity, reproduction, and growth of chickens (Phillips, 1992) Siopes, (1991) observed an increase in egg production in turkey when light intensity was increased ranging 0.5 to 4.3 Lux. However, light intensities of 53.8 and 166.4 Lux appeared to be equally effective in stimulating egg production in turkey hens (Hulet *et al.,* 1992). Similar results were found in chickens in studies with light intensities to 800 Lux (Brake and Baughman, 1989). Davis *et al.,* (1993) reported significantly higher egg production for duckling housed exposed to172 Lux of high-pressure sodium light than for those under 10 Lux of incandescent light and egg weight were not consistently affected by the different light treatments. Kind of light is one of the important factors affecting poultry production. Recently, many poultry producer have changed from incandescent lamps to more energy efficient, longer lasting sources of light such fluorescent or high pressure sodium vapour discharge lamps which produce up to 4-5 times the number of lumens per watt and have 10-28 times the life of incandescent lamps. However, they also produce light which has different spectral characteristics and at frequencies which may be perceived by birds as discontinuous (Lewis and Morris 1999). Felts *et al.,* (1990) found significantly higher hen-day egg production only during the first 10 weeks of the production period for female breeder turkey exposed to sodium vapor or daylight fluorescent lights than for those under incandescent light. One the other hand, Hulet *et al.,* (1992) reported no significant differences in egg production when female exposed to sodium vapor, daylight fluorescent or incandescent lights. Local strains of chickens have the advantages of good adaptation to local environment and natural genetic resistance to some serious diseases such as Marek; also, a lot of people still prefer the taste meat and eggs of local chickens. It was advisable to combine these advantages of local strains with the high performance of the exotic breeds. This was the main of the

Mandara and Dokki-4 local strains under study. Therefore, the objectives of the present study were to determine the effect of strain, type and intensity of light on productive performance rate in some local strains of chickens.

MATERIALS AND METHODS

This experiment was carried out at Sakha Poultry Research Station, Animal Production Research Institute. Mandara and Dokki-4 hens were hatched in April 2006. and reared in confinement under daylengths in open-sided houses until 12 weeks of age. The birds were then moved into a light-controlled house. The windows were covered by black sheets. A total number of 360 birds were used (divided to 180 birds for each strain at 12 weeks of age). Four groups from each strain having nearly equal initial live body weights were randomly assigned to 4 treatments. All birds were individually leg-banded and divided into 4 treatments of each strain (each of 45 birds). The birds of each treatment for each strain were divided into three replicates (each of 15 birds). The treatments of birds were assigned at random to be reared during experimental period (from 12 to 34 weeks of age). Each replicate was housed in separated floor pens (pen size was 200 x 310 cm). The birds of each treatment for each strain were exposed to one of light treatments: white fluorescent 45 Lux (FL), white fluorescent 52 Lux (FH), incandescent 24 Lux (IL) and incandescent 35 Lux (IH) light intensity, measured at the level of the birds heads. The daily lighting period was 14 hours at 12 weeks of age decreased by two hours every week until 15 weeks of age. At 16 weeks of age, the daily light period was increased by one hour weekly until 16 hours / day continuous light and 8 hours darkness at 23 weeks of age. Light intensity estimated by Foot Candle / Lux from 12 to 34 weeks of age. The higher of lamp was 2.10 meter from the floor and the lamps were cleaned every day. The birds of all light treatments were allocated in a brooder houses under similar managerial conditions. The grower diet contained 15.65 % C.P and 2715 ME / Kcal / Kg from 12-20 weeks of age and a laying diet contained 16.37 % C.P and 2750 ME/Kcal/ Kg till 34 weeks of age.

<u>Measurements:</u>

Birds were leg banded and weighed individually to the nearest gram at 12, 16, 20, 34 weeks of age and 50 % of egg production. Body weight gain was calculated every 4 weeks to determine body weight change. Feed consumption was recorded every 4 weeks from each pen and calculated as (g/bird/day). Feed conversion ratio was calculated based on feed consumption for body weight from 12-16, 16-20 and 12-20 weeks of age and based on feed consumption for egg production from 26-30, 30-34 and

26-34 weeks of age. Age at different stages (50 % and the peak) of egg production was calculated as an average of the pen. Eggs were collected and recorded daily from each pen. Egg numbers at 90 day of production was calculated as hen/day/egg production. Egg weights at 50 %, the peak of egg production and 34 weeks of age were calculated as g/hen/day.

Statistical analysis:

The results were statistically analysis by General Linear Models (GLM) procedure as described for statistical analysis of (SAS) user' guide 1996 using two way ANOVA. Duncan's multiple range tests (1955) was used to calculate the significant differences between means at P≤0.05 among means.

RESULTS AND DISCUSSION

Rearing period:

Body weight and body weight gain:

Data for body weight and body weight gain of strains, light treatments and their interactions are presented in Table (1). Body weight at the beginning of the experimental did not differ among the experimental groups. There was a significant strain effect on body weight at 16 and 20 weeks of age, the Mandara strain had on average 1383 grams versus 1346 grams for the Dokki- 4 strain at 20 weeks of age. The total body weight gain of Mandara strain from 12-20 weeks of age were significantly (P≤0.01) higher than those of Dokki-4 strain ones by about 7.1%, that agreed with the results of EL-Soudany (2003) who found that live body weight was not influenced by Golden Montazah and Matrouh strains and Tag El-Din *et al.* (2006) they found significant strain affect on live body weight and body weight gain at 20 weeks of age. Sailer (1985) indicated that the variation in body weight among strains could be attributed to their genetic variation, which affected their growing potential capacity. Differences in body weight at 16 and 20 weeks of age and body weight gain from 12-16, 16-20 and 12-20 weeks of age due to the effect of light treatments were significant (P≤0.01). Meanwhile, the birds exposed to low intensity of fluorescent (FL) were heavier than those of high intensity of fluorescent (FH), low intensity of incandescent (IL) and high intensity of incandescent (IH) light treatments at 16 weeks of age by 5.5, 2.0 and 5.9 % and 7.9, 6.3 and 8.8 % at 20 weeks of age, respectively. The body weight gains of birds exposed to the four light treatments were significant at the intervals from12-16, 16-20 and 12-20 weeks of age. Meanwhile, the birds exposed to (FL) light treatment significantly (P≤0.01) recorded better weight gain by about 18.5, 6.0 and 21.3 % at the interval from 12-16 weeks of age, 18.4, 34.8 and 25.1 % from 16-20 weeks of age and 18.2, 16.1 and 23.1 % from 12-20 weeks of age when compared with birds exposed to (FH), (IL) and (IH) light treatments, respectively Table (1). Light stimuli affected the activity, reproduction, and growth of chickens (Phillips, 1992). The interactions between strains and light treatments were significant (P≤0.01) for body weight only 16 weeks of age and those interactions were significant (P≤0.05 or P≤0.01) in respect to weight gain at intervals from 12-16 and 16-20 weeks of age (Table 1).

Feed consumption and feed conversion ratio:

Table (2) shows that the two strains had nearly similar feed consumption and feed conversion ratio at all studied intervals of rearing period except interval from 16-20 weeks of age were significant (P≤0.05). Raya *et al.* (1990) found significant differences in feed consumption and feed conversion ratio at 20 weeks of age between Dokki-4 and R. I. R. birds and Tag El-Din *et al.* (2006) on Golden Montazah and Matrouh strains. Feed consumption and feed conversion ratio at all studied intervals of rearing period were significant (P≤0.01) with light treatments. Feed consumption was increased significantly (P≤0.01) by birds exposed to (IH), whereas it was 8.94, 13.33 and 16.41 % as compared to birds exposed to (FL), (FH) and (IH) light treatments, respectively in the period from 12-20 weeks of age, with insignificant differences between (FH) and (IH) light treatments at interval 12-16 weeks of age. The results of feed conversion ratio followed the same trend observed for feed consumption. Newberry *et al.*, (1988) found increase in feeding with increased red and blue light intensity. By contrast, Prayitno *et al.*, (1997) found that final body weight, feed consumption and feed conversion ratio at 35 days of broiler chickens were similar in all light treatments (low, medium and high intensity).The interactions between strains and light treatments were significant (P≤0.01) feed consumption at all studied intervals of rearing period, while, those interactions were significant (P≤0.05 or P≤0.01) in respect to feed conversion ratio at intervals from 12-16 and 16-20 weeks of age, respectively.

Laying period:

Live body weight:

Table (3) shows the effect of strains, light treatments and their interactions on live body weight. Mandara strain was significantly (P≤0.01) increased body weight by 2.05 and 2.25 % at 50 % of egg production and 34 weeks of age, respectively, as compared to Dokki-4 strain. These findings agreed with that reported by El Full *et al.* (2005), Tag El-Din *et al.* (2006) and Maghraby *et al.* (2007) found that body weight after sexual maturity was significantly affected by local strains. The light treatments had a significant (P≤0.01) effect on body weight at 50 % of egg production and 34 weeks of age. The birds exposed to (FL) light treatment was the best in respect of body weights at 50 % of egg production and 34 weeks of age followed by those kept under (IL), (FH), and (IH) light treatments. These results agree with those found by Renema and Robinson (2001) who found significant differences in body weight at 45 weeks of age due to light intensity (1, 5, 50 or 500 lx) and among four strains of commercial egg layers. By contrast Siopes (1984) found that body weights at 10 and 20 weeks of the egg production cycle were similar among light intensity (22 or 108 lx) and light source (the cool-white fluorescent and the incandescent light), and Renema *et al.* (2001) who reported that light intensity (1, 5, 50 or 500 lx) had no effect on body weight at sexual maturity. The interactions between strains and light treatments were significantly (P≤0.05) concerning live body weight only at 34 weeks of age.

Feed consumption:

The results in Table (3) indicated that the feed consumption was improved by about 2.87 and 1.90 % in the intervals from 26-30 and 30-34 weeks of age, respectively, and in general 2.28 % in the period from 26-34 weeks of age for Mandara strain when compared with Dokki-4 strain. In this concern, Tag El-Din *et al.* (2006) and Maghraby *et al.* (2007) found significant differences in feed consumption during laying period due to local strains (Fayoumi and Dandarawi). By contrast El-Sheikh (2005) and Mostafa and Roushdy (2007) found no significant differences in feed consumption during laying period of local strains. On the other hand, the light treatments significantly (P≤0.05 or P≤0.01) influenced feed consumption from 26-30, 30-34 and 26-34 weeks of age. The birds of (IH) light treatment significantly (P≤0.01) intervals increased feed consumption by 6.83 and 10.49 % in the interval from 26-34 weeks of age, as compared to birds exposed to (FL) and (IL) light treatments, respectively, but no differences were found between the two light treatments (FH) and (IH) at all studied intervals of laying period. These results agree with those found by Siopes (1984) who found significant differences in feed intake from 18-20 weeks of the egg production cycle due to light intensity (22 or 108 lx) and light source (the cool-white fluorescent and the incandescent light). The interactions between strains and light treatments were significantly (P≤0.05

or P≤0.01) for feed consumption at the three studied intervals of laying period (Table 3).

Feed conversion ratio:

Table (3) shows that the two strains had nearly similar feed conversion ratio at interval from 30-34 weeks of age, The Mandara strain were significantly (P≤0.01) better than Dokki-4 strain ones at intervals from 26-30 and 26-34 weeks of age by about 14.63 and 9.57 %, respectively. El-Full *et al.* (2005), Maghraby *et al.* (2007) and Mostafa and Roushdy (2007) found significant differences in feed conversion during laying period local strains. However, Abou El-Ella (1982) found that the local strains (Alexandria, Mamouwah, El-Salam and their crosses) had no significant effects on feed conversion during the laying period. The light treatments had a significant (P≤0.01) effect on feed conversion ratio at all studied intervals of laying period. The superiority of birds (FH) light treatment over than birds of (FL), (IL) and (IH) light treatments in this respect at the whole laying period from 26-34 weeks of age reached about 8.33, 22.23 and 13.10 %, respectively, with no significant differences between the birds of (FL) and (IH) light treatments (Table 3). Brake and Garlich (1989) found that feed conversion ratio was similar among the light treatments (800 lx of daylight or 20 lx of incandescent light). The interactions between strains and light treatments were insignificant at all studied intervals of laying period except at the interval from 30-34 weeks of age was significant (P≤0.01).

Age at different stages of egg production:

Table (4) shows significant strains, light treatments and their interactions differences in age at different rates (50 % and peak) of egg production. The Mandara strain significantly (P≤0.01) reached 50 % and peak of egg production earlier than those of Dokki-4 strain by 4.8 and 5.4 days, respectively. These results agree with those found by El-Full *et al.* (2005) and Tag El-Din *et al.* (2006) found significant differences in age at sexual maturity or age at different stages of egg production due to local strains. The birds exposed to (FH) and (IH) light treatments reached 50 % and peak of egg production significantly (P≤0.01) earlier than those exposed to (FL) and (IL) light treatments. Meanwhile, the birds exposed to (FL) and (IL) light treatments reached the age at different rates (50 % and peak) of egg production nearly at the same time. These results agree with those found by Siopes (1984) who found significant differences in time to first egg (day) due to light intensity (22 or 108 lx) and light source (the cool-white fluorescent and the incandescent light). By contrast Renema *et al.*(2001) and

Renema and Robinson (2001) found that the time from photo stimulation to sexual maturity did not differ due to light intensity (1, 5, 50 or 500 lx), but found significant differences in age at sexual maturity among four strains of commercial egg layers. The interactions between strains and light treatments were significantly ($P \leq 0.05$ or $P \leq 0.01$) concerning age at 50 % and peak of egg production.

Egg weight:

The averages of egg weights at 50 %, peak of egg production and 34 weeks of age of strains, light treatments and their interactions are presented in Table (4). Egg weight at peak of egg production and 34 weeks of age of Dokki-4 strain were significantly ($P \leq 0.01$) higher than those of Mandara strain, with no significant effect in egg weight at 50 % of egg production due to two strains. Maghraby *et al.* (2007) and Mostafa and Roushdy (2007) found that egg weight was significant among local strains. There were no significant effects due to egg weights among light treatments in all studied periods, except at 34 weeks of age. The superiority of birds (FH) light treatment than birds of (FL), (IL) and (IH) light treatments in this respect at 34 weeks of age, with no significant differences between (FH) and (IL) light treatments. Brake and Garlich (1989) found significant differences in egg weight due to light treatments (800 Lux of daylight or 20 Lux of incandescent light). By contrast Siopes (1984) found no significant differences in egg weight due to light intensity (22 or 108 Lux) or light source (the cool-white fluorescent and the incandescent light). The interactions between strains and light treatments in respect to egg weight were significant ($P \leq 0.01$) at all periods of study except at the peak of egg production which was insignificant. Renema *et al.*(2001) reported that the interaction between strains and light intensity was not significant for egg weight and egg production.

Egg number:

Table (4) shows the effect of significance due to strains, light treatments and their interactions differences in egg number at 34 weeks of age. The Mandara strain were significantly ($P \leq 0.01$) better than those of Dokki-4 strain ones at 34 weeks of age, the Mandara strain surpassed Dokki-4 ones in egg weight by about 11.74 %. Lillpers (1991) observed an earlier oviposition time for the first of sequence egg from a brown egg strains than from white egg strains and hypothesized that brown egg birds had a shorter interval between the LH hormone peak and the subsequent ovulation, that agreed with the results of El-Full *et al.* (2005), Tag El-Din *et al.* (2006) and Maghraby *et al.* (2007) found that egg production was significantly affected by local strains. However, Mostafa and Roushdy (2007) who found that egg production were not influenced by local strains. The superiority of (FH) light treatment than (FL), (IL) and (IH) light treatments in respect egg number at 34 weeks reached about 16.13, 28.11 and 15.76 %, respectively, with no significant effects between (FL) and (IH) light treatments. The increases were probably related to light intensity rather than spectral differences because the absorption of photons is required for any light-induced reproductive effect to occur (Pyrzak and Siopes, 1986). These results agree with those found by Davis *et al.* (1993) who found that the ducklings which received 172 lx of high-pressure sodium (HPS) were significantly better in egg production than those that received 10 lx of (HPS) and 10 or 172 lx of incandescent light and the improvement of egg production in the high-pressure sodium could be due to light intensity or light source. By contrast Brake and Garlich (1989) found no significant differences in egg production due to light treatments (800 lx of daylight or 20 lx of incandescent light). Renema *et al.* (2001) reported a 3.25 reduction in large yellow follicles in 1 lx compared to 500 lx birds at sexual maturity and anticipated that the magnitude of this difference may be great enough for long-term effects on egg production. It can be concluded from the results of this study that Mandara strain surpassed Dokki-4 strain in body weights, body weight gain, feed conversion ratio, age at different stages of egg production, and egg number at 34 weeks of age value, while Dokki-4 strain was significantly better in feed consumption and egg weight. The birds exposed to (FL) light treatment significantly recorded better body weights at 20 and 34 weeks of age, body weight gain, feed consumption and feed conversion ratio from 12-20 weeks of age when compared with birds exposed to (FH), (IL) and (IH) light treatments, whereas, the superiority of birds (FH) than birds of (FL), (IL) and (IH) light treatments in feed conversion ratio from 26-34 weeks, egg weight and egg number at 34 weeks of age.

Table (1): Means and standard error (SE) of body weight and body weight gain (g) at different intervals of rearing period of local strains as affected by type, intensity of light and their interaction

Treatments	**Live body weight (g) at different ages (weeks)**			**Body weight gain (g) at different ages (weeks)**		
	12	**16**	**20**	**12-16**	**16-20**	**12-20**
Strains						
(M)	839 ± 1.10	1169 ± 9.29^{a}	1383 ± 13.69^{a}	330 ± 8.59^{a}	213 ± 5.63^{a}	543 ± 13.04^{a}
(D)	838 ±1.02	1147 ± 8.80^{b}	1346 ± 13.49^{b}	308 ± 8.40^{b}	200 ± 9.61^{b}	507 ± 13.01^{b}
(SL)	Ns	**	**	**	**	**
Light						
(FL)	842±1.41	1196 ± 10.31^{a}	1439 ± 8.26^{a}	353 ±10.33^{a}	244 ± 3.74^{a}	597 ± 7.91^{a}
(FH)	0.95 ± 836	1134 ±7. 22^{c}	1341±10.8^{c}	298 ± 7.21^{c}	206 + 4.87^{b}	505 ± 10.85^{b}
(IL)	840 ± 1.19	1173 ± 3.17^{b}	1354 ± 8.17^{b}	333 ± 3.66^{b}	181 ± 9.22^{d}	514 ± 7.89^{b}
(IH)	838 ± 0.87	1129 ± 5.94^{c}	1323 ± 7.31^{d}	291 ± 6.12^{c}	195 ± 3.89^{c}	485 ± 7.74^{c}
(SL)	Ns	**	**	**	**	**
Interaction						
(M x FL)	843 ± 1.20	1217 ± 6.89	1457 ±1.86	373 ± 7.97	241 ± 5.24	614 ± 3.06
(M x FH)	835 ± 1.45	1148 ± 6.94	1363 ± 5.90	313 ± 6.43	213 ± 6.12	528 ± 6.43
(M x IL)	841 ± 1.73	1172 ± 3.76	1372 + 1.73	331 ± 5.49	200 ± 3.33	531 ± 3.00
(M x IH)	838 ± 1.20	1140 ± 2.91	1337 ± 4.98	302 ± 3.51	198 ± 6.33	500 ± 6.01
(D x FL)	841 ± 2.73	1175 ± 6.57	1421 ± 1.20	333 ± 8.37	247 ± 5.61	579 ± 1.86
(D x FH)	836 ± 1.53	1120 ± 2.60	1318 + 6.57	284 ± 1.86	199 ± 5.24	482 ± 5.04
(D x IL)	839 ± 1.86	1175 ± 5.81	1336 ± 0.88	335 ± 5.61	161 ± 5.20	496 ± 1.20
(D x IH)	838 ± 1.53	1117 ± 6.57	1309 ± 6.06	279 ± 6.84	191 ± 5.04	471 ± 7.31
(SL)	Ns	**	Ns	*	**	Ns

abcd: Means within each column within each trait have no similar letter (s) are significantly different at P>0.05
Mandara (M), Dokki-4 (D), Fluorescent low (FL), Fluorescent high (FH) Incandescent low (IL), Incandescent high (IH), Significant level (SL).

Table (2): Means and standard error (SE) of feed consumption (g / bird / day) and feed conversion (g feed/ g weight gain) at different intervals of rearing period of local strains as affected by type, intensity of light and their interaction.

Treatments	Feed consumption at different intervals (weeks) of age			Feed conversion ratio at different intervals (weeks) of age		
	12-16	16-20	12-20	12-16	16-20	12-20
Strains						
(M)	60.83 ± 1.44	76.22 ± 1.26 [a]	137.04 ± 2.62	5.49 ± 0.28	10.11 ± 0.36 [b]	7.80 ± 0.31
(D)	61.56±1.09	74.21 ± 1.54 [b]	135.67 ± 2.55	5.39 ± 0.21	10.61 ± 0.38 [a]	8.00 ± 0.24
(SL)	**Ns**	*****	**Ns**	**Ns**	*****	**Ns**
Light						
(FL)	59.27± 1.37 [b]	74.43 ± 0.73 [c]	133.70 ± 1.86 [d]	4.57 ± 0.18 [b]	8.58 ± 0.12 [c]	6.57 ± 0.10 [c]
(FH)	64.00± [a] 0.49	76.95 ± 0.64 [b]	140.95 + 0.69 [b]	5.96 ± 0.09 [a]	10.50 ± 0.29 [b]	8.23 ± 0.14 [b]
(IL)	65.03± 0.64 [c]	69.08 ± 1.60 [d]	125.12 ± 1.92 [c]	4.96 + 0.26 [b]	10.79 ± 0.37 [b]	7.87 ± 0.17 [b]
(IH)	65.47 ± 0.83 [a]	80.38 ± 1.07 [a]	145,65 ± 1.82 [a]	6.28 ± 0.18[a]	11.59 ± 0.23[a]	8.94 ± 0.17[a]
(SL)	******	******	******	******	******	******
Interaction						
(M x FL)	56.50 ± 0.87	73.67 ± 0.87	130.17 ± 1.65	4.20 ± 0.10	8.58 ± 0.21	6.39 ± 0.13
(M x FH)	64.03 ± 0.87	76.63 ± 0.99	140.67 ± 0.86	5.86 ± 0.17	10.08 + 0.42	7.98 ± 0.13
(M x IL)	56.17 ± 1.16	72.00 ± 0.50	128.17 ± 1.30	5.36 ± 0.39	10.06 ± 0.20	7.71 ± 0.28
(M x IH)	66.60 ± 0.91	82.57 ± 0.77	149.17 ± 1.52	6.55 ± 0.20	11.72 ± 0.39	9.14 ± 0.25
(D x FL)	62.03 ± 1.01	75.20 ± 1.16	137.23 ± 1.45	4.93 ± 0.13	8.57 ± 0.15	6.52 ± 0.11
(D x FH)	63.97 ± 0.66	77.27 ± 1.00	141.23 ± 1.25	6.05 ± 0.08	10.91 ± 0.30	8.48 ± 0.15
(D x IL)	55.90 ± 0.82	66.17 ± 1.99	122.07 ± 2.72	4.55 ± 0.14	11.52 ± 0.32	8.04 ± 0.18
(D x IH)	64.33 ± 1.14	78.20 ± 0.62	142.13 ± 1.37	6.01 ± 0.22	11.47 ± 0.32	8.74 ± 0.18
(SL)	******	******	******	******	*****	**Ns**

abcd: Means within each column within each trait have no similar letter (s) are significantly different at P>0.05
Mandara (M), Dokki-4 (D), Fluorescent low (FL), Fluorescent high (FH) Incandescent low (IL), Incandescent high (IH), Significant level (SL).

Table (3): Means and standard error (SE) of body weight feed consumption (g/ bird/ day) and feed conversion (g feed / g egg) at different intervals of rearing period of local strains as affected by type, intensity of light and their interaction.

Treats / Treatments	Live body weight (g) at 50% of egg production	Live body weight (g) at 34 weeks of ages	Feed consumption (g) at different intervals (weeks) of age 26-30	30-34	26-34	Feed conversion ratio at different intervals (weeks) of ages 26-30	30-34	26-34
Strains								
(M)	1495 ± 20.4^{a}	1635 ± 18.9^{a}	96..8 ± 2.4^{a}	123.1 ± 1.2^{a}	219.9 ± 3.2^{a}	5.74 ± 0.3^{b}	4.92 ± 0.1	5.33 ± 0.2^{b}
(D)	1465 ± 17.6^{b}	1599 ± 13.1^{b}	94.1 ± 1.5^{b}	120.8 ± 1.8^{b}	215.0 ± 3.1^{b}	6.58 ± 0.3^{a}	5.10 ± 0.1	5.84 ± 0.1^{a}
(SL)	**	**	**	**	**	**	**Ns**	**
Light								
(FL)	1573 ± 9.0^{a}	1700 ± 17.8^{a}	92.5 ± 1.0^{b}	119.5 ± 1.4^{b}	212.0 ± 1.3^{b}	5.98 ± 0.3^{b}	4,94 ± 0.1^{b}	5.46 ± 0.2^{b}
(FH)	1421 ± 8.9^{c}	1591 ± 7.7^{c}	99.9 ± 1.2^{a}	126.3 ± 1.0^{a}	226.2 ± 1.8^{a}	5.10 ± 0.2^{c}	4.98 ± 0.2^{b}	5.04 ± 0.2^{c}
(IL)	1499 ± 12.9^{b}	1614 ± 7.2^{b}	87.1 ± 0.8^{c}	117.9 ± 2.6^{b}	205.0 ± 2.4^{c}	7.49 ± 0.3^{a}	4.82 ± 0.1^{b}	6.16 ± 0.1^{a}
(IH)	1428 ± 5.0^{c}	1565 ± 9.2^{d}	102.4 ± 2.2^{a}	124.1 ± 1.5^{a}	226.5 ± 3.4^{a}	6.06 ± 0.1^{b}	5.31 ± 0.1^{a}	5.70 ± 0.1^{b}
(SL)	**	**	*	*	**	**	*	**
Interaction								
(M x FL)	1590 ± 6.3	1737 ± 8.5	93.4 ± 0.8	116.9 ± 1.3	210.3 ± 1.7	5.44 ± 0.2	4.83 ± 0.1	5.14 ± 0.1
(M x FH)	1433 ± 9.9	1599 ± 11.1	101.2 ± 2.0	125.3 ± 0.9	226.5 ± 2.9	4.72 ± 0.1	4.53 ± 0.1	4.63 ± 0.1
(M x IL)	1524 ± 9.8	1625 ± 7.8	86.4 ± 1.6	123.4 ± 1.5	209.8 ± 1.8	6.93 ± 0.4	4.98 ± 0.1	5.96 ± 0.2
(M x IH)	1431 ± 6.1	1580 ± 10.5	106.3 ± 2.3	126.7 ± 1.1	233.0 ± 2.0	5.85 ± 0.2	5.34 ± 0.1	5.60 ± 0.1
(D x FL)	1555 ± 7.2	1663 ± 11.3	91.6 ± 1.8	122.1 ± 1.3	213.7 ± 1.7	6.52 ± 0.1	5.05 ± 0.2	5.79 ± 0.1
(D x FH)	1409 ± 12.4	1583 ± 10.4	98.6 ± 1.4	127.4 ± 1.8	225.9 ± 2.7	5.47 ± 0.1	5.42 ± 0.1	5.45 ± 0.1
(D x IL)	1473 ± 8.1	1603 ± 8.8	87.9 ± 0.2	112.3 ± 1.3	200.2 ± 1.3	8.05 ± 0.2	4.65 ± 0.2	6.35 ± 0.1
(D x IH)	1424 ± 8.7	1549 ± 9.0	98.5 ± 1.8	121.5 ± 1.9	220.0 ± 3.1	6.26 ± 0.0	5.27 ± 0.2	5.79 ± 0.1
(SL)	**Ns**	*	**Ns**	**	**	**Ns**	**	**Ns**

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

Mandara (M), Dokki-4 (D), Fluorescent low (FL), Fluorescent high (FH) Incandescent low (IL), Incandescent high (IH), Significant level (SL).

Table (4): Means and standard error (SE) of age, egg weight and egg number at different stages of egg production of rearing period of local strains as affected by type, intensity of light and their interaction.

Treats / Treatments	Age (day) at		Egg weight (g) at			Egg number
	50% of egg production	Peak of egg production	50% of egg production	Peak of egg production	34 weeks of age	at 34 weeks of age
Strains						
(M)	195.8 + 1.42 b	214.4 + 2.44 b	43.0 + 0.14	43.6 + 0.07 b	44.3 + 0.12 b	33.3 ± 1..11 a
(D)	200.6 + 1.84 a	219.8 + 1.93 a	42.6 + 0.22	44.3 + 0.06 a	44.8 + 0.08 a	29.8 ± 0.66 b
(SL)	**	**	Ns	**	**	**
Light						
(FL)	202.3 + 1.12 a	225.0 + 1.46 a	43.0 + 0.06	43.9 + 1.1	44.4 + 0.21 b	31.0 ± 0.54 b
(FH)	190.8 + 0.60 c	209.5 + 1.12 b	42.6 + 0.43	44.1 + 0.22	44.8 + 0.07 a	36.0 ± 1.42 a
(IL)	203.7 + 1.58 a	223.0 + 0.68 a	42.6 + 0.23	44.0 + 0.19	44.6 + 0.26 ab	28.1 ± 0.58 c
(IH)	196.0 + 1.75 b	211.0 + 2.48 b	42.8 + 0.25	43.9 + 0.14	44.4 + 0.11 b	31.1 ± 0.79 b
(SL)	**	**	Ns	Ns	**	**
Interaction						
(M x FL)	200.0 ± 0.58	222.0 ± 1.15	43.0 ± 0.10	43.6 ± 0.06	43.9 ± 0.03	31.9 ± 0.55
(M x FH)	190.3 ± 0.8	207.3 ± 0.88	43.4 ± 0.20	43.7 ± 0.26	43.9 ± 0.03	39.2 ± 0.25
(M x IL)	200.7 ± 1.20	222.7 ± 0.88	43.0 ± 0.20	43.6 ± 0. 07	44.0 ± 0.20	29.2 ± 0.43
(M x IH)	192.3 ± 0.67	205.7 ± 1.20	42.4 ± 0.34	43.6 ± 0.14	44.2 ± 0.13	32.9 ± 0.33
(D x FL)	204.7 ± 0.67	228.0 ± 0.58	43.0 ± 0,09	44.2 ± 0.02	44.8 ± 0.05	30.1 ± 0.53
(D x FH)	191.3 ± 0.88	211.7 ± 0.88	41.7 ± 0.47	44.5 ± 0.13	44.9 ± 0.05	32.9 ± 0.46
(D x IL)	206.7 ± 1.45	223.3 ± 1.20	42.3 ± 0.34	44.4 ± 0.12	45.1 ± 0.12	27.0 ± 0.49
(D x IH)	199.7 ± 1.20	216.3 ± 0.8	43.3 ± 0.14	44.2 ± 0.04	44.5 ± 0.13	29.4 ± 0.22
(SL)	*	**	**	Ns	**	**

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

Mandara (M), Dokki-4 (D), Fluorescent low (FL), Fluorescent high (FH) Incandescent low (IL), Incandescent high (IH), Significant level (SL).

REFERENCES

Abou El-Ella, N. Y. (1982). *A comparative study on the performance potentiality of four locally developed strains and their F_1 crosses. M. Sc. Thesis, Fac. of Agric, Alex. Univ., Egypt.*

Brake, J.M., and G. R. Baughman (1989). *Comparison of lighting regimens during growth on subsequent seasonal reproductive performance of broilerbreeders. Poult. Sci., 68: 79-85.*

Brake, J. M. and J. D. Garlich (1989). *Effects of lighting program during the growing period and dietary fat during the laying period on broiler breeder performance. Poult. Sci., 68: 1185-1192.*

Davis, G. S.; C. R. Parkhurst, and J. Brake (1993*).* *Light intensity and sex ratio effects on egg production, egg quality characteristics, and fertility in breeder Pekin ducks. Poult. Sci., 23-29.*

Duncan's, D. B. (1955). *Multiple range and multiple F-test, Biometrics 11: 1-42.*

El-Full, E. A; H. M. Abd El-Wahed; M. M. Namra; A. M. R. Osman and N. A. Hataba (2005). *Results of random sample test for laying performance of nine Egyptian strains of chickens. Egypt. Poult. Sci., Vol. 25 (I): 195– 208.*

El-Sheikh, A. M. H. (2005). *Reducing the cholesterol content in local chickens. Egypt Poult. Sci., Vol. 25 (I): 29 – 59.*

El–Soudany, S. M. (2003). *Effect of crossbreeding between two strains of chickens on productive performance. Ph. D. Thesis, Fac. of Agric. Ain Shams Univ., Egypt.*

Felts, J. V., A. T. Leighton, JR., D. M. Denbow, and R. M. Hulet (1990). *Influence of light sources on the growth and reproduction of large white turkeys. Poult. Sci., 69: 567-583.*

Hulet, R. M.; D. M. Benbow, and A. T. Leighton, Jr. (1992). The effect of light source and intensity on turkey egg production. *Poult. Sci., 71: 1277-1282.*

Lewis, P. D. and T. R. Morris (1999*). Light intensity and performance in domestic pullets. Worlds Poultry Science Journal 55: 241-250.*

Lillpers, K. (1991). *Genetic variation in the time of oviposition in the laying hens. Br. Poult. Sci., 32: 303-312.*

Maghraby,N.; S. A. Yassein, and H. M. El-Allawy (2007). *Response of some local strains of laying hens to diets supplemented with different levels of sunflower oil under hot climatic conditions. Egypt. Poult. Sci., Vol. 27 (I): 79-100 .*

Mostafa, K. M. and K. H. Roushdy (2007). *The effect of genotype, lactic acid bacteria and their interaction on performance of two local layer hens. Egypt. Poult. Sci., Vol. 27 (I): 165-183.*

Newberry, R. C.; J. R. Hunt, and E. E. Gardiner (1985). *Effect of alternating lights and strain on behavior and leg disorders and sudden death syndrome of roaster chickens. Poult. Sci., 64: 1863-1868.*

Newberry, R. C.; J. R. Hunt, and E. E. Gardiner (1988). *Influence of lightintensity on behavior and performance of broiler chickens. Poult. Sci., 67: 1020-1025.*

Phillips, C. J. C. (1992). *Environmental factor influencing the production and welfare of farm animals: Photoperiod. Pages 49-65 in farm animals and the Environmental. C. J. C. Phillips and Piggins, ed. CAB International, Oxford. UK.*

Prayitno, D. S.; C. J. C. Phillips, and D. K. Stokes (1997). *The effect of color and intensity of light on behavior and leg disorders in broiler chickens. Poult. Sci., 76: 1674-1681.*

Pyrzak, R. and T. D. Siopes (1986). *Effect of light quality on egg production of caged turkey hens. Poult. Sci., 65:199-200.*

Raya, A. H.; M. M. Khalifah and K. El-Sherif (1990). *Influence of dietary protein level on the performance of growing Dokki-4 and R.I.R. chickens.1-Effect on growth rate, feed conversion, meat composition and blood constituents. Egypt. Poult. Sci., 10: 179-205.*

Renema, R. A. and F. E. Robinson (2001). *Effects of light intensity from photostimulation in four strains of commercial egg layers: 1. Ovarianmorphology and carcass parameters. Poult. Sci., 80: 1112-1120.*

Renema, R. A.; F. E. Robinson; H. H. Oosterhoff; J. J. Feddes and J. L. Wilsont (2001). *Effects of photostimulatory light intensity on ovarianmorphology and carcass traits at sexual maturity in modern and antique egg-type pullets. Poult.Sci., 80: 47-56.*

Renema, R. A.; F. E. Robinson; J. J. Feddes; G. M. Fasenko and M. J. Zuidhoft (2001). *Effects of light intensity from photostimulation in fourstrains of commercial egg layers: 2. Egg production parameters. Poult. Sci., 80: 1121-1131.*

SAS.1996. *SAS Procedure Guide "Version 6.12 Ed." SAS Institute Inc Cary, NC, U. S. A.*

Sailer, K. (1985). *Nutzung Kompensaterischer wachstum effekte beiderprodukion schwerer Mastbroiler. Ph. D. Thesis, Hohenheim Univ., Germany.*

Siopes, T. D (1984). *The effect of high and low intensity cool–white fluorescent lighting on the reproductive performance of turkey breeder hens. Poult. Sci., 63: 920 – 926.*

Siopes, T. D. (1991). *Light intensity for turkey breeder hens: Degree of darkness required during short-day light restriction and intensity threshold during photostimulation. Poult. Sci., 70: 1333-1338.*

Tag El-Din, H. T.; K. El-Sherif; M. A. Ali; E. F. Abd El-Hamid and A. E. El- Slamony (2006). *Productive and reproductive performance of Golden Montazah and Matrouh chickens as affected by some light colours. Egypt. J. Agric. Res., 84 (5) 1587-1601.*

Weaver, W. D., and P. B. Siegel (1968). *Photoperiodism as a factor in feeding rhythms of broiler chickens. Poult. Sci., 47: 1148-1154.*

الملخص العربى

تأثير شدة ونوع الأضاءة على معدل الأداء الأنتاجى فى بعض السلالات المحلـية

على ابراهيم السلامونى سعيد فاروق حسان محمد محمود سليمان السيد ايمن العبد

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أجريت هذه الدراسة لمعرفة تأ ثير السلالات ومعاملات الأضاءة والتداخل بينهما على أداء سلالتى المندرة ودقى4 خلال الفترة من 12-34 أسبوع من العمر.

أستخدم فى هذه الدراسة عدد 360 طائر قسمت الى 180 طائر لكل سلالة عند 12 اسبوع من العمر. ثم قسمت كل سلالة الى 4 معاملات عشوائيا لتصبح أوزان الجسم تقريبا متساوية. وقد احتوت كل معاملة من كل سلالة عل 3 مكررات بكل مكررة 15 طائر. طيور كل معاملة من كل سلالة تعرضت لواحد من أربعة معاملات أضاءة هى:- 1- شدة أضاءة منخفضة من الفلورسنت (الأبيض) 45 lx (FL) 2- شدة أضاءة مرتفعة من الفلورسنت 52 lx (FH) 3- شدة أضاءة منخفضة من الضوء المتوهج 24 lx (IL) 4- شدة أضاءة مرتفعة من الضوء المتوهج 35 lx (IH) والتى تم قياسها عند مستوى رأس الطيور **وكانت اهم النتائج المتحصل عليها هى:-**

- كانت سلالة المندرة الأفضل معنويا فى صفات أوزان الجسم عند 20 و 34 أسبوع من العمر والعائد من وزن الجسم فى الفترة من 12-20 أسبوع من العمر وكفاءة تحويل الغذاء فى الفترة من 26-34 أسبوع من العمر والعمر عند 50% وعند القمة من انتاج البيض وكذلك عدد البيض عند34 أسبوع من العمر.

- كانت سلالة دقى 4 الأفضل معنويا فى صفات أستهلاك الغذاء فى الفترة من 26-34 أسبوع من العمر ووزن البيضة عند القمة من انتاج البيض وكذلك عند34 أسبوع من العمر.

- لم تؤثر السلالة معنوياعلى صفات أستهلاك الغذاء وكفاءة تحويل الغذاء فى الفترة من 12-20 أسبوع من العمر.

- الطيور التى تعرضت الى معاملة (FL) كانت الأفضل معنويا فى صفات أوزان الجسم عند 20 و34 أسبوع من العمر والعائد من وزن الجسم وأستهلاك الغذاء وكفاءة تحويل الغذاء فى الفترة من 12-20 أسبوع من العمر عندما قورنت بالمعاملات الأخرى.

- تفوقت معنويا الطيور التى تعرضت الى معاملة (FH) على معاملات الأضاءة الأخرى فى صفتى كفاءة تحويل الغذاء فى الفترة من 26-34 أسبوع من العمر وعدد البيض عند34 أسبوع من العمر.

- أنخفضت معنويا صفة أستهلاك الغذاء فى الفترة من 26-34 أسبوع من العمر فى الطيور التى تعرضت الى معاملة (IL) عندما قورنت بمعاملات الأضاءة الأخرى.

- الطيور التى تعرضت الى معاملات (IH) و (FH) وصلت الى العمر عند 50% وعند القمة من انتاج البيض مبكرا عن معاملات الأضاءة (IL) و (FL).

- تفوقت الطيور التى تعرضت الى معاملة (FH) على معاملات الأضاءة الأخرى فى صفة وزن البيضة عند 34 أسبوع من العمر مع عدم وجود أختلافات معنوية بين معاملات الأضاءة (IL) و (FH).