EFFECT OF TEMPERATURE AND LIGHT DURING INCUBATION ON THE PRODUCTIVE PERFORMANCE AND SEMEN CHARACTERISTICS OF MALES OF TWO LOCAL BREEDS OF CHICKENS

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Abstract

A total of 1500 eggs (750 for each breed Fayoumi (Fa) and Golden Montazah (GM)) was used to study the effect of different temperatures (optimum temperature 99.5°F to elevate 102.5°F or decreased to 96.5°F for 6 hours/ day) and lighting types (dark, normal and fluorescent) during incubation period on body weight, feed intake, feed conversion, rectal temperature, respiration rate, and semen quality.

The results revealed that:

1- The body weight of (GM) breed was always significantly higher than that of (Fa) breed ($p \leq 0.05$) allover the experiment ages. The high temperature increased the overall mean body weight compared with the low temperature and control at 4,8 and 12 weeks of age. The fluorescent light treatment increased the average body weight compared with the control group at 4,8 and 12 weeks of age

2- Eggs exposed to high temperature or fluorescent light treatments during incubation, increased feed intake when compared with other treatments. The better-feed conversion was recorded for (Fa) control group when compared with its counterparts. As for (GM) strain, it could be seen that better feed conversion was noticed for high temperature group when compared with its correspondence. The differences in feed intake and feed conversion between all treatments were insignificant.

3- The effect of high temperature was decrease in rectal temperature of the two breeds at 2 weeks of age compared with the control treatment. The normal and /or fluorescent light had a higher overall mean rectal temperature compared with the control at 4,8 and 12weeks of age.

4- All treatments had increased respiration rate in the (GM) breed compared with the control at all ages except the high or low temperature at 12 weeks, which has a lower respiration rate. The

fluorescent light increased the overall mean respiration rate compared with the control treatment at all ages.

5- The high temperature during incubation had a higher increase in life sperms % and a decrease in dead and abnormality sperm percentages in males of (Fa) and (GM) breeds.

In general, these results indicated that the fertile eggs exposed to high temperature or fluorescent light had a beneficial effect on body weight, feed conversion and semen quality in (Fa) and (GM) breeds.

INTRODUCTION

It is important to study the growth and semen quality of males of chickens. There are many factors influencing the growth and semen quality such as temperature and light during incubation. It has been shown that incubation temperatures can affect posthatch growth in the domestic fowl and turkey (Decuypere, 1979, Geers *et al.* 1983 and Christopher *et al.* 1993). Decuypere (1979) noticed that chicks incubated at the lower incubation temperature (33.8 °C) weighed less when compared to a group incubated at a higher temperature (37.8 °C). Kuhn *et al.* (1982) found that the chicks incubated at 33.8° C had a lower body weight on day 3 post hatches, but, relative growth was accelerated from the 2nd week on, resulting in equal weight on the 36th day for males and the 43 rd day for females. Decuypere *et al.* (1985) found that incubation temperature (33.8 °C) from the 17th day of the incubation until hatching resulted in decreasing feed intake. High temperature and normal light during incubation produced chicks more adapted to environment, decreased chick mortality and decreased rectal temperature (Abdel- Samad, 1998).

Studies of the effect of fluorescent light on chick body weight at hatch have concluded that body weight is lower (Gill and Gangwar, 1985) or higher (Coleman and McDaniel, 1975) or the same (Lauber and Shutze, 1964, Lowe and Garwood, 1977 and Szymkiewiez *et al.*,1985) . Kalamah, *et al.* (2000) reported that eggs exposed to white light during incubation gave insignificant heavier chicks at most of the growing periods (0-8 week) than dark treatment.

It is suggested that acclimatization to temperature and light may be induced through prehatch stage. The purposes of the present study were to illustrate the effect of temperature and light during incubation on productive performance and semen quality of the two local breeds of chickens.

MATERIALS AND METHODS

The present study was carried out at El-Takamoly Poultry project El-Fayoum governorate during the period from February to September 2002, where the two local breeds Fayoumi(Fa) and Golden Montazah(GM) were used in order to study the effect of temperature and light during incubation on productive performance and semen characteristics .

A total of 1500 eggs was used in this study (750 eggs for each breed). The eggs of each breed were divided to five groups:

1- Control group (optimum temperature 99.5 ^{0} F at 1-18 days, the incubator was nonlighted (dark).
2- High temperature (the same as in control, but it was increased to 102.5 ^{0} F for 6 hours daily –dark).
3- Low temperature (the same as in control, but it was decreased to 96.5 0 F for 6 hours daily –dark).
4- Normal light (the eggs were incubated under continuous normal light during the period from 1-18 days, while the temperature was 99. 5 F.)
5- Fluorescent light (the same as in treatment, 4, but, using fluorescent light)

The eggs of each breed were placed in the same type of incubator for 18 days at 55% relative humidity with automatic eggs turning (every hour). The source of light was 40 watt either for normal or fluorescent light put on 20 cm over the top of eggs. After the sexing of the hatched chicks allover the different treatments of the two breeds, random samples (each of 30 males) from each treatment were taken. These chicks were reared under similar condition up to 12 weeks of age after numbering and weighing individually, then, to 28 weeks.

The experimental diets and fresh water were offered *ad libitum*. Chicks were given diets (19% CP and 2800 Kcal .ME/Kg) during the period one – day old up to 12 weeks. The grower diet (15%CP and 2700K cal. ME/ Kg) was given after that period until end of the experimental period.

Measurements in all treatments were recorded for body weight, rectal temperature and respiration rate every 4 weeks. Feed intake and feed conversion were recorded during the experimental period. Rectal temperature was measured by inserting the clinical thermometer in the rectum for one minute. Respiration rate was

estimated by the hand to count the frequency of the chest movements per minute. Feed conversion was estimated by using following equation:

$$\text{Feed conversion} = \frac{\textit{Feed intake per cock / 2 weeks}}{\textit{Body gain per cock / 2 weeks}}$$

Semen specimens were artificially collected free of transparent fluid by abdominal massage technique at 28 weeks of age. Ejaculated volume (ml) was measured using calibrated pipette. Sperm motility was estimated just after semen collection by microscopical examination. The percentages of abnormal and dead spermatozoa were determined in 100 sperms.

Data were statistically analyzed according to Steel and Torrie (1980). Significant differences among treatment means were determined using Duncan's multiple range tests (Duncan, 1955).

RESULTS AND DISCUSSION

Body weight after hatching

The effect of treatments on body weight of (Fa) and (GM) male chicks are shown in Table 1. Data showed that the average body weight of (GM) breed was always significantly higher than that of the (Fa) breed in all treatments under study at all ages. The high temperature treatment increased the overall mean body weight compared with the low temperature and control treatments at 4, 8 and 12 weeks of age. The low temperature treatment increased the overall mean body weight compared with the control treatment at all ages. These results disagreed with those of Decuypere (1979) who observed that chicks incubated at the lower incubation temperature (33.8 °C) weighed less than control treatment (37.8 °C). It appears that fluorescent light treatment decreased the body weight of the two breeds at hatch compared with the control treatment. These results agreed with those of Gill and Gangwar, (1985) and, disagreed with those of Coleman and McDanial (1975). Also, the fluorescent light treatment increased the average body weight compared with the control treatment at 4,8 and 12 weeks of age. The effect of high temperature on average body weight was similar to the effect of normal light at different ages. The

eggs exposed to all the treatments during incubation gave insignificant heavier chicks at 4 and 12 weeks of ages than control treatment of the two breeds.

Feed intake and Feed conversion

Results obtained in Table 2 showed that the feed intake of (GM) breed was always higher than (Fa) breed in all treatments. The differences in feed intake between breeds were insignificant. The high temperature treatment increased feed intake compared with the low temperature treatment. These results disagreed with those of Decuypere *et al.* (1985). The fluorescent light treatment increased feed intake compared with all treatments. The differences in feed intake between all treatments were insignificant.

The data in Table 2 showed that feed at 12 weeks only, conversion in (GM) breed was better than (Fa) breed in all treatments during the experimental period. The better-feed conversion was recorded for (Fa) control group (4.44) compared with all treatments. The better-feed conversion was noticed for the high temperature treatment in (GM) breed (3.83) compared with all other treatments. The differences in feed conversion between all the treatments were insignificant.

Rectal temperature

Results indicated that the overall mean of rectal temperature of (GM) breed was higher than that of (Fa) breed at all ages, except at 4 weeks (Table 3.) The differences in rectal temperature between breeds were insignificant. The high temperature decreased the overall mean of rectal temperature at 2 weeks of age compared with the control treatment (41.9°C and 42.0°C, respectively). These results confirm those of Abdel-Samad (1998). The light regime increased the overall mean of rectal temperature at 4, 8 and 12 weeks of age compared with the control treatment, except the normal light at 12 weeks of age. The differences in average rectal temperature between treatments were insignificant at 2,4 and 8 weeks of age in the two breeds.

Respiration rate

The differences in overall mean respiration rate values were insignificant due to breeds at all ages (Table 4). It appears that the respiration rate in the (GM) breed was slightly higher in all treatments compared with the control treatment at all ages, expect the high temperature and low temperature at 12 weeks of age which had a

lower respiration rate. The fluorescent light treatment increased the average respiration rate compared with the control treatment at all ages. The differences in overall mean respiration rate between treatments were insignificant at 4 weeks of age in the two breeds.

Semen characteristics

Data in (Table 5.) show means and standard error of semen characteristics of the two breeds at 28 weeks of age. The semen characteristics of (GM) males were better than those of (Fa) breed. The high temperature treatment increased the average ejaculate volume, motility percent and percent of live sperms, while, it decreased percent of dead and abnormality sperms compared with the low temperature and control treatments. The fluorescent light treatment increased the average ejaculate volume, motility percent and percent of live sperms, and decreased dead and abnormality sperms percentages compared with the normal light treatment.

It can be concluded that the fertile eggs exposed to high temperature or fluorescent light during incubation had a beneficial effect on body weight, feed conversion and semen quality in Fayoumi and Golden Montazah males.

REFERENCES

1. Abdel-Samad, M.H. 1998. Effect of temperature and light during incubation on hatching, growth and laying performance in chickens. Thesis, Ph.D. Fac. Agric. Fayoum, Cairo Univ.

2. Christopher, D.M, M.B Janice, F. Marisue, H. W Robert, K. T. Robert and Y. H. Patricia. 1993. Response of layer breeders to dietary Acetylsalicylic acid: 3- Effect on fertility and hatchability of embryos exposed to control and elevated incubation temperature. Poult. Sci., 72:1100-1108 .

3. Coleman, M. A. and G. R McDaniel. 1975. The effect of light and specific gravity on embryo weight and embryonic mortality. Poult. Sci., 54:1415-1421 .

4. Decuypere, E.1979. Effect of incubation temperature patterns on morphological, physiological and reproduction criteria in Rhode Island Red birds. Agriculturea, 27: 66-280 .

5. Decuypere, E, P. Peczely, T. Muray, Y. Balthazart, H. Michels and Kuhn. 1985. Long –term effect of incubation temperature on production parameters and changes in Luteinizing hormon and gonadol steroids during the onset of lay in the hen. Poult. Sci., 64: 1785- 1792 .

6. Duncan, D. B. 1955. Multiple range and multiple tests Biometrics, 11: 1- 42

7. Geers R., H. Michels, G. Nackaerts and F. Kanings. 1983. Metabolism and growth of chickens before and after hatch in relation to incubation temperature. Poult. Sci., 62: 1869- 1875 .

8. Gill, S. P. S. and P. C. Gangwar. 1985. Effect of fluorescent and red light on the development of chick embryo. Indian J. Anim. Res., 19: 21-28.

9. Kalamah, M. A., M. MF. El-Nady, H.Abdou and A. H.Nadia. 2000. Performance and some blood constituents of Quail chicks hatched from eggs exposed to different light colours during incubation. Poult. Sci., 20: 583 – 601.

10. Kühn, E. R., E. Decuper, L. M. Colen and H. Michels. 1982. Posthatch growth and development of a circadian rhythm for thyroid hormones in chicks incubated at different temperature. Poult. Sci., 61: 540 – 549.

11. Lauber, J. F. and J. V. Schutze. 1964. Accelerated growth of embryo chicks under the influence of light. Growth, 28: 179 – 190.

12. Lowe, P. C. and V. A. Garwood. 1977. Chick embryo development rate in response light stimulus. Poult. Sc., 56: 218 – 222.

13. Steel, R. G. and J. H. Torrie. 1980. Principles and procedures of statistics. 2nd edit. McGraw Hill Book Co. Inc. New York.

14. Szymkiewicz, M. M., Z. Rzeszewska and W. Wojtczak. 1985. Effect of illumination of incubated chicken eggs on embryonic and embryonic development. Ann. Warsaw. Agric. Univ. SGGW-Ar. Anim. Sci., 19: 15-19.

Table 1. Means ± SE. of body weight (grams) of (Fa) and (GM) males chicks at different ages.

Age and breed		Control (dark)	High temp	Low temp	Normal light	Fluorescent light	Overall mean
At hatch	Fa	29.70^{a} ± 0.41	27.33^{a} ± 0.53	28.70^{a} ± 0.67	28.53^{a} ±0.41	28.71^{a} ± 0.63	28.51^{B} ±0.254
	GM	31.04^{b} ± 0.35	32.29^{a} ± 0.59	34.28^{a} ±0.78	31.63^{a} ±0.62	29.15^{b} ±0.72	31.65^{A} ±0.388
Overall mean		30.37^{A} ± 0.311	29.63^{A} ±0.741	31.49^{A} ±0.875	29.83^{A} ±0.496	28.96^{A} ±0.48	
4weeks	Fa	219.00^{a} ±12.69	223.09^{a} ± 10.73	221.38^{a} ± 8.68	229.64^{a} ± 9.35	228.75^{a} ± 9.58	224.63^{B} ±4.474
	GM	225.38^{a} ±7.48	243.50^{a} ±9.83	233.50^{a} ±12.59	233.63^{a} ±11.23	228.8^{a} ±5.34	232.76^{A} ±4.073
Overall mean		222.19^{A} ±7.117	231.68^{A} ±7.647	227.44^{A} ±7.551	231.32^{A} ±6.999	228.78^{A} ± 5.019	
8weeks	Fa	500.25^{a} ±33.09	464.73^{a} ±23.87	426.13^{b} ±5.05	506.09^{a} ±26.45	489.0^{a} ±23.71	478.3^{B} ±11.44
	GM	509.50^{a} ±17.76	582.50^{a} ±10.33	587.13^{a} ±27.74	564.63^{a} ±28.99	525.9^{a} ±16.4	552.6^{A} ±10.162
Overall mean		504.88^{A} ±18.178	514.32^{A} ±19.712	506.63^{A} ±24.85	530.74^{A} ±20.223	509.5^{A} ±14.205	
12 weeks	Fa	726.00^{a} ±21.44	702.73^{a} ±33.06	704.00^{a} ±12.07	761.81^{a} ±30.18	740.00^{a} ± 25.57	727.61^{B} ± 12.361
	GM	820.00^{a} ±10.35	943.75^{a} ±53.22	858.38^{a} ± 44.55	867.13^{a} ±48.10	906.00^{a} ±34.67	880.33^{A} ± 18.457
Overall mean		773.00^{a} ±16.720	804.21^{a} ±40.024	781.19^{a} ±29.906	806.16^{a} ±28.668	832.222^{a} ± 29.553	

- a, b,c,d : means within the same row with different letters are significantly different (P≤ 0.05).
- A,B: Overall means in row and column within each effect having different letters are significantly different (P≤ 0.05).

Table 2. Means ± SE. of feed intake (g./ bird. day) and feed conversion (g. / g. Body gain) of (Fa) and (GM) males chicks during the experimental period.

Breed		Control (dark)	High temp	Low temp	Normal light	Fluorescent light	Overall mean
Feed intake	Fa	36.13^{a} ± 5.580	38.54^{a} ± 6.498	38.58^{a} ± 6.369	38.53^{a} ± 6.206	38.95^{a} ± 6.031	38.14^{A} ± 2.657
	GM	38.43^{a} ± 6.103	41.04^{a} ± 6.929	40.47^{a} ± 6.574	40.55^{a} ± 6.517	40.79^{a} ± 6.378	40.25^{A} ± 2.812
Overall mean		37.28^{A} ± 4.051	39.79^{A} ± 4.653	39.53^{A} ± 4.480	39.54^{A} ± 4.406	39.87^{A} ± 4.297	
Feed conv.	Fa	4.44^{a} ± 0.631	4.76^{a} ± 0.711	4.75^{a} ± 0.614	4.49^{a} ± 0.588	4.59^{a} ± 0.605	4.61^{A} ± 0.273
	GM	4.20^{a} ± 0.415	3.83^{a} ± 0.434	4.36^{a} ± 0.576	4.13^{a} ± 0.512	3.92^{a} ± 0.418	4.09^{A} ± 0.207
Overall mean		4.32^{A} ± 0.370	4.30A ± 0.419	4.56^{A} ± 0.414	4.31^{A} ± 0.542	4.25^{A} ± 0.366	

- a, b,c,d : means within the same row with different letters are significantly different (P≤ 0.05).
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Table 3. Means ± SE. of rectal temperature (°C) of (Fa) and (GM) males chicks at different ages.

Age and breed		Control (dark)	High temp	Low temp	Normal light	Fluorescent light	Overall mean
2 weeks	Fa	41.9^{a} ± 0.067	41.7^{a} ± 0.058	41.9^{a} ± 0.058	42.0^{a} ± 0.321	41.9^{a} ± 0.088	41.9^{A} ± 0.069
	GM	42.2^{b} ± 0.208	42.1^{a} ± 0.318	42.4^{a} ± 0.058	41.9^{a} ± 0.058	42.1^{a} ± 0.145	42.1^{A} ± 0.086
Overall mean		42.0^{A} ± 0.123	41.9^{A} ± 0.132	42.1^{A} ± 0.178	42.0^{A} ± 0.148	42.0^{A} ± 0.088	
4 weeks	Fa	41.6^{a} ± 0.067	41.7^{a} ± 0.145	41.6^{a} ± 0.318	41.9^{a} ± 0.145	41.1^{a} ± 0.296	41.9^{A} ± 0.076
	GM	41.8^{a} ± 0.233	42.0^{a} ± 0.173	42.1^{a} ± 0.186	41.9^{a} ± 0.033	41.9^{a} ± 0.351	41.9^{A} ± 0.088
Overall mean		41.7^{A} ± 0.115	41.9^{A} ± 0.114	42.0^{A} ± 0.095	41.9^{A} ± 0.067	42.0^{A} ± 0.212	
8 weeks	Fa	41.8^{a} ± 0.088	41.8^{a} ± 0.088	42.1^{a} ± 0.115	41.9^{a} ± 0.066	42.0^{a} ± 0.100	41.9^{A} ± 0.043
	GM	41.9^{a} ± 0.208	41.8^{a} ± 0.033	42.2^{a} ± 0.058	42.2^{a} ± 0.153	42.5^{a} ± 0.328	42.1^{A} ± 0.098
Overall mean		41.8^{A} ± 0.102	41.8^{A} ± 0.043	42.1^{A} ± 0.062	42.1^{A} ± 0.095	42.3^{A} ± 0.194	
12 weeks	Fa	41.9^{a} ± 0.208	42.2^{a} ± 0.058	41.8^{a} ± 0.058	42.2^{a} ± 0.058	41.6^{a} ± 0.219	41.9^{A} ± 0.079
	GM	41.9^{c} ± 0.088	42.1^{bc} ± 0.088	42.6^{a} ± 0.058	41.7^{bc} ± 0.260	42.3^{ab} ± 0.088	42.1^{A} ± 0.096
Overall mean		41.9^{A} ± 0.102	42.1^{A} ± 0.056	42.2^{A} ± 0.183	41.9^{A} ± 0.158	42.0^{A} ± 0.183	

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Table 4. Means ± SE. of respiration rate (breath / min.) of (Fa) and (GM) males chicks at different ages.

Age and breed		Control (dark)	High temp	Low temp	Normal light	Fluorescent light	Overall mean
2 weeks	Fa	72.0^{b} ± 1.155	84.0^{a} ± 2.000	75.0^{ab} ± 2.887	65.0^{b} ± 2.887	75.5^{ab} ± 2.887	74.2^{A} ± 1.880
	GM	69.3^{ab} ± 3.333	74.0^{ab} ± 3.055	71.3^{ab} ± 2.906	75.0^{ab} ± 2.887	82.6^{a} ± 3.712	74.5^{A} ± 1.715
Overall mean		70.6^{A} ± 1.687	79.0^{A} ± 2.769	73.2^{A} ± 2.007	70.0^{A} ± 2.887	78.8^{A} ± 2.713	
4 weeks	Fa	64.0^{a} ± 5.033	70.0^{a} ± 5.292	68.3^{a} ± 4.410	67.3^{a} ± 3.712	72.6^{a} ± 2.667	68.5^{A} ± 1.807
	GM	60.6^{a} ± 4.055	66.3^{a} ± 3.333	72.3^{a} ± 6.333	73.3^{a} ± 3.333	72.6^{a} ± 2.667	69.1^{A} ± 2.035
Overall mean		62.3^{B} ± 2.985	68.3^{A} ± 2.894	70.3^{A} ± 3.565	70.3^{A} ± 2.603	72.6^{A} ± 1.687	
8 weeks	Fa	70.3^{a} ± 3.283	60.0^{ab} ± 5.774	72.0^{a} ± 4.163	62.0^{ab} ± 3.055	58.6^{a} ± 4.667	64.6^{A} ± 2.190
	GM	49.3^{b} ± 5.812	55.8^{b} ± 2.838	62.0^{a} ± 8.718	61.6^{a} ± 1.667	67.6^{a} ± 1.453	59.1^{A} ± 2.526
Overall mean		59.8^{A} ± 5.564	57.5^{A} ± 3.096	67.0^{A} ± 4.865	61.8^{A} ± 1.558	63.2^{A} ± 2.971	
12 weeks	Fa	55.0^{a} ± 2.887	61.6^{a} ± 4.410	56.6^{ab} ± 7.265	50.3^{ab} ± 3.180	53.6^{ab} ± 4.485	55.5^{A} ± 2.040
	GM	48.0^{ab} ± 1.528	47.6^{ab} ± 1.453	46.6^{ab} ± 3.330	51.6^{ab} ± 4.410	53.3^{ab} ± 8.819	49.5^{A} ± 1.922
Overall mean		51.5^{A} ± 2.141	54.6^{A} ± 3.756	51.6^{A} ± 4.216	51.0^{A} ± 2.449	53.5^{A} ± 4.425	

- a, b,c,d : means within the same row with different letters are significantly different (P≤ 0.05).
- A,B: Overall means in row and column within each effect having different letters are significantly different (P≤ 0.05).

Table 5. Means ± SE. of semen characteristics of (Fa) and (GM) males chicks at 28 weeks of age.

Breed	Control (dark)	High temp	Low temp	Normal light	Fluorescent light	Overall mean
Volume (ml) Fa	0.325^{a} ± 0.075	0.400^{a} ± 0.058	0.375^{a} ± 0.095	0.350^{a} ± 0.065	0.425^{a} ± 0.048	0.374^{A} ± 0.029
GM	0.200^{b} ± 0.058	0.467^{a} ± 0.033	0.467^{a} ± 0.033	0.333^{ab} ± 0.120	0.450^{a} ± 0.029	0.388^{A} ± 0.035
Overall mean	0.271^{B} ± 0.052	$0/433^{AB}$ ± 0.033	0.414^{AB} ± 0.055	0.343^{AB} ± 0.057	0.438^{A} ± 0.026	
Motility (%) Fa	80.00^{a} ± 4.082	86.67^{a} ± 3.333	75.00^{a} ± 6.46	77.50^{a} ± 6.292	77.50^{a} ± 6.292	78.95^{A} ± 2.405
GM	70.00^{a} ± 5.774	86.67^{a} ± 3.333	83.33^{a} ± 3.333	70.00^{a} ± 11.547	87.50^{a} ± 2.500	80.00^{A} ± 3.028
Overall mean	75.71^{A} ± 3.689	86.67^{A} ± 3.333	78.57^{A} ± 4.041	74.29^{A} ± 5.714	82.50^{A} ± 3.660	
Live numbers (%) Fa	85.75^{ab} ± 0.854	91.67^{a} ± 1.453	85.25^{b} ± 1.181	84.50^{b} ± 0.645	85.50^{a} ± 1.708	86.26^{A} ± 0.737
GM	84.67^{ab} ± 1.764	90.67^{a} ± 1.333	89.33^{a} ± 1.764	87.33^{ab} ± 1.764	86.25^{ab} ± 1.315	87.56^{A} ± 0.811
Overall mean	85.29^{B} ± 0.837	91.17^{A} ± 0.910	87.00^{AB} ± 1.234	85.71^{B} ± 0.944	85.88^{B} ± 1.008	
dead numbers (%) Fa	14.25^{a} ± 0.854	8.33^{b} ± 1.453	14.75^{a} ± 1.181	15.50^{a} ± 0.645	14.50^{a} ± 1.708	13.74^{A} ± 0.737
GM	15.33^{a} ± 1.764	9.33^{b} ± 1.333	10.67^{b} ± 1.764	12.67^{a} ± 1.764	13.75^{a} ± 1.315	12.44^{A} ± 0.811
Overall mean	14.71^{A} ± 0.837	8.83^{B} ± 0.910	13.00^{AB} ± 1.234	14.29^{A} ± 0.944	14.13^{A} ± 1.008	
Abnormality (%) Fa	20.00^{a} ± 1.871	13.00^{a} ± 1.155	21.50^{a} ± 3.797	16.50^{a} ± 5.204	20.50^{a} ± 1.658	19.53^{A} ± 1.110
GM	20.00^{a} ± 1.155	16.67^{a} ± 0.882	20.00^{a} ± 2.887	21.00^{a} ± 2.082	19.50^{a} ± 0.645	19.44^{A} ± 0.724
Overall mean	20.00^{A} ± 1.091	14.83^{B} ± 1.046	20.86^{A} ± 2.324	21.00^{A} ± 0.926	20.00^{A} ± 0.845	

- a, b : means within the same row with different letters are significantly different ($P \leq 0.05$).
- A,B: Overall means in row and column within each effect having different letters are significantly different ($P \leq 0.05$).

تأثير الحرارة والإضاءة أثناء التفريخ على الأداء الإنتاجي وعلى صفات السائل المنوي لديوك سلالتين مختلفتين من الدواجن من السلالات المحلية

محمود حسن عبد الصمد

معهد بحوث الإنتاج الحيواني- مركز البحوث الزراعية- وزارة الزراعة-الدقى-جيزة-مصر

تم استخدام عدد ١٥٠٠ بيضة مخصبة (٧٥٠ بيضة من سلالة الفيومي و٧٥٠ من سلالة المنتزه الذهبي) لدراسة تأثير درجات الحرارة المختلفة للمفرخ أثناء فترة التفريخ

(الحرارة المثلي ٥ و ٩٩ °ف ترفع إلى ١٠٢,٥ °ف أو تخفض إلى ٥و ٩٦ °ف وذلك لمدة ٦ ساعات يوميا) وكذلك لدراسة تأثير نوع الإضاءة أثناء التفريخ (الإظلام- العادية- الفلورسنت) وذلك على وزن الجسم ، والعلف المأكول ، ومعدل التحويل الغذائي، ودرجة حرارة المستقيم ، ومعدل التنفس ، وصفات السائل المنوي.

النتائج المتحصل عليها يمكن تلخيصها في الآتي:

١- متوسط وزن الجسم في المنتزه الذهبي دائما أعلى من الفيومي والفرق معنوي عند مستوى ٠,٠٥ في كل الأعمار. والحرارة العالية أدت إلى زيادة متوسط وزن الجسم بالمقارنة بالحرارة المنخفضة ومجموعة المقارنة عند عمر ٤، ٨ ، ١٢ أسبوعاً . وكذلك أدت الإضاءة الفلورسنت إلى زيادة متوسط وزن الجسم بالمقارنة بالكنترول عند عمر ٤ ، ٨ ، ١٢ أسبوعاً .

٢- البيض المعرض للحرارة العالية أو الإضاءة الفلورسنت أثناء التفريخ أدى إلى زيادة المأكول من العليقة بالمقارنة بباقي المعاملات عند ١٢ أسبوعاً. وكان أحسن معامل تحويل غذائي لسلالة الفيومي غير المعامل بالمقارنة بباقي المعاملات . وكان أحسن معامل تحويل غذائي لسلالة المنتزه الذهبي المعامل بالحرارة العالية بالمقارنة بباقي المعاملات. والاختلافات بين المعاملات في كل من العلف المأكول ومعامل التحويل الغذائي اختلافات غير معنوية.

٣- الحرارة العالية أدت إلى انخفاض درجة حرارة المستقيم في السلالتين عند عمر اسبوعين مقارنة بمعاملة الكنترول . والإضاءة العادية أو الفلورسنت أدت إلى ارتفاع درجة حرارة الجسم بغض النظر عن النوع عند عمر ٤، ٨ ، ١٢ أسبوعاً.

٤- كل المعاملات أدت إلى زيادة معدل التنفس في المنتزه الذهبي مقارنة بالكنترول عند كل الأعمار ماعدا الحرارة العالية والمنخفضة عند عمر ١٢ أسبوعاً إذ أدت إلى انخفاض معدل التنفس. ومعاملة الإضاءة الفلورسنت أدت إلى زيادة معدل التنفس مقارنة بالكنترول عند كل الأعمار بغض النظر عن السلالة.

٥- الحرارة العالية أثناء التفريخ أعطت زيادة في نسبة الحيوانات المنوية الحية ، وأدت كذلك إلى تقليل نسبتي الحيوانات المنوية الميتة وغير الطبيعية في ذكور الفيومي والمنتزه الذهبي.

عموما يتضح من النتائج أن تعرض البيض المخصب للحرارة العالية أو الإضاءة الفلورسنت أثناء التفريخ يؤدى إلى تحسن في وزن الجسم ومعامل التحويل الغذائي وجودة السائل المنوي في ذكور سلالتي الفيومي والمنتزه الذهبي.