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EFFECT OF INCUBATION TEMPERATURE SCHEME ON SOME INCUBATION TRAITS AND POST-HATCH GROWTH FOR LOCAL CHICKEN STRAINS

BY

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Abstract: *The present experiment was conducted to study the effect of incubation temperature (T) scheme on some incubation traits and post-hatch growth for two local chicken strains.The present study was carried out at EL-Sabahia Poultry Reseach Station, Animal Production Reseach Institute, Agricultare Reseach Center. Experiments were conducted utilizing total number of 1860 hatching eggs obtained from Gimmizah(G) and Mandarah (M) local chicken strains. Eggs produced from each chicken strain were randomly distributed into two systems of incubation temperature. The incubation temperature of traditional used system was fixed for the setting incubation period 0 -18 days as 99.5ºF and 98.6ºFduring for the hatching period (18-21) days. Incubation temperatures of second suggested system were 100.2ºF for a period from 1-10days of incubation, 99.5ºF for a period of 11-18days and 98.6ºF for last period of 18-21 days. Gimmizah and Mandarah eggs subjected to the suggested system of temperature lost a higher significant ($P \leq 0.05$)weight through the periods (0 – 10 and 0 – 18 days)compared to the eggs subjected to traditional ones. The shortest time in maximum recored of post- hatch time for the same mentioned strains was 504 hr for the suggested temperature system. Mandarah eggs for new suggested system represented a higher significant ($P \leq 0.05$) hatchability percentage of total eggs compared to G eggs subjected to both systems .Chicks weights at hatch and at pull out (gm) were significantly ($P \leq 0.05$) heavier for chicks of G strain than for M strain for two systems. Body weight of G chicks which produced under the suggested incubation system were heavier significantly ($P \leq 0.05$) than G chicks which produced under traditional system on 2^{nd},4^{th},6^{th},and 8^{th}weeks of age. Weight gain for G and M chicks produced from the suggested system were significantly ($P \leq 0.05$) larger than*

those produced under traditional one during the accumulated growing period of (0 – 8) weeks of ages. The best results of feed conversion during the first two weeks of age was recorded for M chicks subjected to traditional temperature system. Generally the best results of feed conversion were realized for both chick strains subjected to suggested temperature system compared to those subjected to the traditional one during the periods (4 – 6 wks), (6 - 8 wks)and (0 -8 wks) of age.

It is concluded from the results of this research that suggested temperature system had realized better results of hatchability of total eggs and body weight at eight weeks of age compared to traditional ones.

INTRODUCTION

Temperature (T) is the most critical physical factor of artificial incubation affecting hatchability and plays an important role in embryonic development (Bagley,1987). A review of the literature indicates that some researches had been directed to the interrelationships between hatching T ,relative humidity (RH%) and egg weight loss in reference to hatchability and chick weight at hatch, at pull out(time of removal from hatcher) and post-hatch growth.

It is well known that the optimal T is the primary concern in the achievement of satisfactory hatching results (Landaure,1967 and Peebles,1986). Most poultry species have an optimal T for hatching success (Christensen et al,1994 and Decuypere,1994). French (1997) reported that the T experienced by developing embryo is dependent on the incubator T, and the metabolic heat production of the embryo.

For many domesticated species the amount of egg weight loss is around 12-14% of initial egg mass by pipping time,(Tullett,1990 and Soliman,2000).Tullett and Burton(1982) reported that over 97% of the variation in chick weight at hatch was accounted by fresh egg weight and egg weight loss. Shahein ,(2002) reported that incubation T has a main effect on egg weight loss and hatch time.

Rizk et al, (2004) stated that hatchability of fertile eggs was numerically increased by 99.5Fº T (86.37%) compared with 98.6Fº (83.87%) and 100.4Fº (85.75%) of local chicken strains. While highest hatchability was observed when eggs were incubated at a constant eggshell temperature (Lourens and Van Middelkoop,2000 and lourens et al, (2005). Joseph et al, (2006) stated that lower temperature in the first 10d of incubation reduced hatchability while higher temperature in the hatcher increased total hatchability.

Hulet et al ,(2007) reported that incubation T has a great effect on chick weight at hatch.Moreover,the incubation T has indeed been found to affect subsequent growth of the hatched chicks (Kϋhn et al.,1982 and Geers et al .,1983). Fanguy et al .,(1980)reported that early hatched chicks showed a significant reduction in placement weight which continued to be evident at four weeks of age. Nir and Levanon ,(1993) showed that feed intake and body weight for chicks at 21 and 40 days of age were inversely related to the period of holding in the incubator and the chicks did not compensate for their post-hatching body weight. There are many publications on the feed consumption and feed conversion during four and six weeks of age on Alexandria, SilverMontazah,Gimmizah,Bandarah,Fayomi and Mandarah breeds(Kosba et al.,1985 and Saleh et al.,1994).Recent publication of Lourens et al., (2005) showed that the highest hatchability and post-hatch performance were found when eggshell temperature was maintained at 37.8ºC constantly throughout incubation. Hulet et al ,(2007) showed that no significant differences in feed conversion at market age were found between birds subjected to different embryonic temperatures treatment.

The present study was conducted to examine the effect of incubation temperature scheme throughout setting phases of incubation for Gimmizah (G) and Mandarah (M) strains on some incubation traits and post-hatch growth.

MATERIALS AND METHODS

The present study was carried out during the period from September 2006 up to April 2007 at EL-Sabahia Poultry Research Station ,Animal Production Research Institute, Agricultural Research Center. Experiments were conducted utilizing total number of 1860 hatching eggs obtained from Gimmizah(G) and Mandarah (M) local chicken strains. The birds aged 35 week-old at the beginning of the experiment. Eggs of all experimental trials were collected daily from floor pens and stored seven days in room temperature being supplied with fans. Eggs produced from each chicken strain were randomly distributed into two systems of incubation temperature. All trials of the study were done in two forced draft-type incubators which were electronically controlled for temperature (T) and relative humidity (RH%).

Experimental Design :

Two temperature systems were used for G and M eggs and replicated five times for each chicken strain and each system. The traditional incubation temperature (99.5ºF) was used as system one and fixed for the setting incubation period (0 -18 days) and 98.6ºFduring the hatching period for 18-21 days. Incubation temperatures of suggested second system were 100.2ºF for a period from 1-10days of incubation, 99.5ºF for a period of 11-18days and 98.6ºF for last period of 18-21 days. Relative humidity was fixed for the both experimented systems at 55% for the setting period and 65% for the rest hatching period.

Incubation and its Parameters:

One hundred and eighty six hatching eggs for each trial lot of chicken strain were used and replicated five times .No significant difference were recorded between hatching egg weights at the start of experiment. Eggs were numbered consecutively and weighed before setting in the incubator. The time of setting eggs in the incubator was recorded for each trial to obtain the exact hatch time in hours, and considered the zero hour of the experiment. All eggs were set and distributed randomly in three trays at different places in the same trolley of incubator to reduce possible position effects. All eggs were weighed individually again during incubation on the 1^{st} ,10^{th},11^{th} and 18^{th} days of incubation in order to obtain egg weight loss percentages under different experimented degrees of T . The percentages of egg weight loss for each incubation interval were calculated as a percentage of the fresh egg weight. On the 18^{th} day (432hr) of incubation, all eggs were transferred singly into pedigree hatching baskets and then placed into the hatcher for the remainder period of the incubation. Chicks that had fully emerged from eggs were removed, wing-banded, weighed to the nearest 0.1gm and recorded as chick body weight at hatch then placed again to the incubator after recording the time of hatch. Hatching time and body weight at hatch were recorded monitored every eight hours after the hatch of the first chick. The chicks were left in the incubator until servicing time (termination of incubation). All chicks were weighed again at the time of removal from the hatcher at 504hr. Chicks weight at pull was the weight of the chicks determined at the time of removal from the hatcher.

Chick body weight loss during incubation expressed on an absolute and percentage basis was calculated according to the following equation of Shahein,(2002).

$$Chick\ weight\ loss\ \% = \frac{\text{Chick weight at hatch} - chick\ weight\ at\ pull\ out}{\text{Chick weight at hatch}} \times 100$$

Hatchability was calculated as the percentage of sound chicks that hatched from either total or fertile eggs.

$$Hatchability\ of\ total\ eggs\ set\ \% = \frac{\text{Total number of hatched chicks}}{Total\ number\ of\ eggs\ set} \times 100$$

$$Hatchability\ of\ fertile\ eggs\ \% = \frac{\text{Total number of hatched chicks}}{Total\ number\ of macroscopical\ fertile\ eggs} \times 100$$

Post-hatch growth:-

Chicks were transferred and randomly distributed into batteries in groups of 25 chicks per cages and replicated three times. Chicks were raised in local-made batteries up to eight weeks of age. Each floor is supplied with separated heater, feeders and waterers.The chicks were fed a ration (20.2% crude protein CP,3015.0 Kcal Metabolizable energy ME/Kg) and formulated as recommendation of NRC(1994) for growing period.The composition of growing ration is shown in Table 1.

Feed and water were offered for *ad libitum*. Chicks were individually weighed biweekly to the nearest gram up to eight weeks of age. Also,body weight gain and feed conversion ratio were recorded biweekly and the whole eight weeks of age. Mortality throughout the experimental was low and therefore neglected.

Statistical analysis:-

Data were subjected to analysis of variance using General Linear Model (GLM) SAS Institute, SAS User´s Guide, 1994. When significant differences among means were found, means were separated using Duncan´s Range Test (1955). All percentages of studied traits were transformed to arcsin percentage before analysis of variance (Snedecor and Cocharan, 1967). Data were analyzed using the following model:-

$$Y_{ijk} = \mu + S_i + B_j + (S \times B)_{ij} + e_{ijk}$$

Where:-

Yijk =an observations ; μ= overall mean; Si=the fixed effect of the ith system of incubation ; Bj= the fixed effect of the j^{th} strains ; $(SXB)_{ij}$ = the interaction effect of the system of incubation with strain and

e_{ijk} = random error

The present study was conducted to examine the effect of incubation temperature scheme throughout setting phases of incubation for Gimmizah (G) and Mandarah (M) strains on some incubation traits and post-hatch growth.

RESULTS AND DISCUSSION

Data obtained concerning the effect of two systems traditional system(TS_1) and second one as suggested system(SS_2) of incubation temperature on egg weight loss for both G and M eggs during setting phase of incubation are shown in Table 2. Gimmizah eggs subjected to the suggested system of temperature lost a higher significant ($P \leq 0.05$)weight through the periods (0 – 10 and 0 – 18 days)compared to the eggs subjected to traditional ones and those for M strain which subjected to the both experimented systems. This means that eggs of each strain had a special response with respect to egg weight loss during incubation. The explanation of the different response of eggs under different temperature of incubation could be due to the differences of egg quality layers and genetical factor of each chicken strain. Also,egg weight loss during the first ten days is more than those during the rest period of setting phase.While, there were no significant differences between both strains for two systems in the period of (11 – 18) days of incubation. These results partially agree with the results of Shahein (2002) who reported that egg incubated at T of 100.4ºF lost significantly ($P \leq 0.05$) more weight compared to eggs incubated at either 98.6ºF or 99.5ºF. Egg hatchability depend in part on the occurrence of a specific loss in egg weight between the first days of incubation and pipping interval (Tullett,1981; Meir et al ,1984). This weight loss has been estimated around 15% for numerous avian species under conditions of natural incubation (Tazawa,1980).

Table 3 shows the effect of incubation temperature systems on macroscopical egg fertility and hatchability of G and M chicken eggs. Macroscopic fertility and hatchability of fertile eggs percentages were numerically increased for suggested system of G and M eggs compared with those from traditional ones without any significant effect.While , M egg for suggested system represented a higher significant ($P \leq 0.05$) hatchability percentage of total eggs compared to G eggs subjected to either two system. Whereas there were no significant differences between G for both experimented systems and M for traditional one. Hatchability is the only parameter for incubation success which is easy to quantify as well as being important for an economic point of new. Moreovere,no information is available concerning temperature requirement for each chicken strains and in turn embryonic development which affecte the hatchability percentage. The explanation for the results herein may be due to that the chosen temperature of suggested system is covering the physiological requirements of M chicken eggs during incubation. Romijn and Lokhorst,(1956) reported that heat production of the embryo itself raising egg temperature above the incubator temperature by almost 2ºC . Lundy (1969) reported that the temperature which produce the best hatch lies somewhere in the range of 37.0 to 38.0ºC for incubation. Results regarding the significant differences between both systems for hatchability of total eggs percentage disagree with the results reported by Joseph et al, (2006) who stated that the lower temperature than the normal one in the first 10 d of incubation reduced hatchability while higher temperature in the hatcher increased total hatchability.

Effect of incubation temperature systems on the minimum , maximum and range of hatch time for chicks of G and M strains are shown in figure 1. This figure shows that the maximum recorded of post- hatch time (hr) for G and M chicks for traditional system were 509 hr and 508 hr respectively . Whereas the shortest in maximum recored of post- hatch time for the same mentioned strains was 504 hr for the suggested temperature system . Moreover, range between maximum and minimum time of hatched chicks for both strains inside the hatcher under traditional system was 32hr. Whereas the range between minimum and maximum recorded was 29 and 30 hr for the both strains under the suggested system. Generally, these results agree with the results of shahein (2002) who indicated that range of hatch time between 30 and 32 hrs for incubation on temperature of 99.5ºF and 100.4ºF for Egyptian strains. Moreover, Decuypere and Michls (1992) stated that deviations in temperature affected the developmental speed of the embryos.

Effects of incubation T systems on chick body weight at hatch and at pull out and chick weight loss for G and M strains are shown in Table 4. This table reveals that chicks weights at hatch and at pull out (gm) were significantly ($P \leq 0.05$) heavier for chicks of G strain than for M strain for the both systems. While, M chicks lost more weight percentage for both used systems (7.94 and 8.03%) respectively compared to G strain (6.41 and 5.53%), respectively for two systems. Differences in egg weight for local strains were reported by many investigators (Mahmoud et al.,1981; and Abd EL-Galil, 1993). The increasing of chick weight at hatch and at pull for G strain compared to M strain may be explained by the increasing of G eggs weight compared to M eggs weight. These results and explanation support the finding of Tullett and Burton (1982) who suggested that fresh egg weight and weight loss of an egg during incubation determine the weight of chick at hatch.

Results regarding the significant differences between chick body weight at pull for both strains are in accordance with the conclusion of Wilson (1991)who reported that weight of chicks at hatch is affected by chicken breed (the hatch in this research is considered as removal from the hatcher) . Also, Decuypere and Michels (1992) reported that deviation of incubation temperature alters the embryogenesis growth. Yet, the obtained results referring to the significant difference in chick body weight at pull with different incubation temperatures disagree with the results reported by Swann (1989) who showed that chick body weight at removal (pull) was unaffected by incubation T.

Table 5 represents the effect of incubation T systems on body weight of post- hatch growing chicks for G and M strains. It could be noticed from this table that G chicks which produced from the both incubation systems were significantly($P\leq 0.05$) heavier than those for M chicks at the start of rearing period. Moreover, G chicks which produced under the suggested incubation system were significantly ($P\leq 0.05$) heavier than G chicks which produced under traditional system on 2^{nd},4^{th},6^{th},and 8^{th}weeks of age .Whereas, M chicks which produced under suggested system were significantly ($P\leq 0.05$) heavier than those produced under traditional system at the end of ages (8week).

Effect of incubation T systems on the body weight gain for post- hatch chicks of G and M strains are shown in table 6. These data reveals that the response of weight gains for G and M chicks produced from the suggested system were significantly ($P \leq 0.05$) larger than those produced under traditional one during the accumulated growing period of (0 – 8) weeks of ages. From the results herein , it is concluded that incubation T do have an effect on the subsequent growth of studied chicks. Moreover, the best system of incubation T to realize more body weight and body weight gain during the first eight weeks of age was the suggested system. Therefore, we support the notion of Decuypere (1984) who observes that possible effects of condition during incubation must be considered in post – hatching growth. Also, we recommend study the effect of incubation T within the optimum rang on subsequent growth during long term of growing for each chicken breed or strain.The results of the chicks body weight in present study nearly confirm the results of Kϋhn et al,(1982) and Geers et al,(1983) as they noticed that egg incubated at different temperatures showed different growth curves. Also, approximately 2.0ºC decreace after the day 16^{tn} of incubation will increase the likelihood of obtaining a greater chick weight, body weight gain and subsequently a heavier bird at 3 weeks of age. Geers et al.,(1983) suggested a link between incubation T and metabolic level up to the reproduction period of fowl.

Effect of incubation T systems on feed conversion (gm feed/gm gain) of post- hatch growth for G and M chicks are presented in Table 7. The worst results of feed conversion during the first two weeks of age was recorded for M chicks subjected to suggested temperature system, while there were no significant differences between other experimented systems and strains. Also, there were no significant differences between the records of feed conversion during the period of 2 – 4 wks of age. Generally, the best results of feed conversion were realized for both chick strains subjected to suggested temperature system compared to those subjected to the traditional one during the periods (4 -6 wks) , (6 - 8 wks)and (0 -8 wks) of age.

Geers et al., (1982) advocated an extended sensitive period up to several weeks of post – hatch age , for setting the appetite in the hypothalamus of domestic fowl. Indeed,during succeeding experiments a post – hatch growth was observed (Geers et al, 1982)and higher maintenance requirements up to the reproduction period (Michels et al ,1980;Geers, 1981). Supporting to our results, Hulet et al, (2007) showed that no significant differences in feed conversion at market age were found between birds subjected to different embryonic temperatures treatment. However, chicks incubated at the high temperature had significantly poorer feed conversion at 21d of age than those from the low temperature or middle temperatures.

It is concluded from the results of this research that suggested temperature system had realized better results of hatchability of total eggs and body weight at eight weeks of age compared to traditional ones. Moreover,this area of research needs more studies and other suggested incubation temperatures for each chicken strain to achieve the optimum embryonic and chick growth.

Table (1). Composition and calculated analysis of the diet from zero up to 8 weeks of age.

Ingredients	**Growing diet %**
Yellow corn	69.5%
Soybeen meal (44% protein)	19.5
Wheat bran	-
Fish meal	8.35
Bone meal	1.4
Limestone	0.65
Methionine	0.05
Lysine	-
Premix*	0.25
Salt (NaCI)	0.3
Calculated analysis:	
Crude protein(%)	20.2
Ether extract(%)	3.22
Crude fiber(%)	2.64
ME.Kcal/Kg	3015.0
Ca	1.022
Av.P	0.357
Lysine	1.139
Methionine	0.452
Cystine	0.340

Premix*:- minerals and vitamins premix used at the rate of Kg/ton d.et.Each 205Kg contains: 12.000,000 I.U. Vit.A 2.000,000 I.C.U. Vit.D,10gm Vit E 2gm VitK,1gm .VitB14gm.VitB2,1.5gm VitB6,10gm VitB12,10gm VitB4,50gm VitB5,500gm choline Cl,20gmNicotinic acid; 100gm Folic acid 10gm CU;1gm Iodine;30gm Fe;55gm Mn.,55gm Zn0.1gm Selenium and Ca-carbonate to 2500gm.

Table (2).Egg weight loss percentage for different chicken strains during different Intervals of incubation as affected by incubation temperature systems

Intervals	Egg weight loss %		
Variables	0 – 10 day $\bar{x}$ ±S.E	11 – 18 day $\bar{x}$ ± S.E	0 – 18 day $\bar{x}$ ± S.E
TS_1G	6.82±0.01^b	4.86±0.09	11.35±0.14^b
TS_1M	6.91±0.17^b	3.23±1.50	11.17±0.12^b
SS_2G	7.69±0.11^a	4.59±0.09	11.91±0.16^a
SS_2M	6.69±0.08^b	4.90±0.08	11.25±0.13^b
Overall Mean	6.98±0.06	4.31±0.46	11.37±0.07

a and b Means within each column for each item with different superscripts are significantly different (P≤ 0.05)

TS_1G=Traditional systems one of Gimmizah ,TS_1M=Traditional systems one of Mandarah,SS_2G= Suggested secand systems of Gimmizah , SS_2M= Suggested secand systems of Mandarah .

Table (3). Effect of incubation temperature systems macroscopic fertility and hatchability of Gimmizah and Mandarah chicken eggs

Traits / Variables	Fertility % $\bar{X}$±S.E	Hatchability of fertile eggs % $\bar{X}$ ±S.E	Hatchability of total eggs % $\bar{X}$± S.E
TS_1G	87.50±1.44	85.78±3.04	75.00±1.44^b
TS_1M	90.83±1.66	88.92±2.84	80.66±3.48^b
SS_2G	88.13±3.64	91.17±0.40	80.38±3.68^b
SS_2M	92.20±4.10	93.56±1.95	86.15±3.69^a
Overall Mean	89.67±1.38	89.86±1.31	80.55±1.73

a and b Means within each column for each item with different superscripts are significantly different (P≤ 0.05)

TS_1G=Traditional systems one of Gimmizah ,TS_1M=Traditional systems one of Mandarah,SS_2G= Suggested secand systems of Gimmizah , SS_2M= Suggested secand systems of Mandarah .

Table (4). Effect of incubation temperature systems on chick body weight at hatch and ,at pull out and chick weight loss incubation for Gimmizah and Mandarah strains

Traits / Variables	Chick body weight (g)		Chick weight loss %
	At hatch $\bar{X}$ ±S.E	At pull out $\bar{X}$ ±S.E	$\bar{X}$ ±S.E
TS_1G	41.78±0.35^a	39.23±0.39^a	6.41±0.40^b
TS_1M	39.42±0.30^b	36.29±0.32^b	7.94±0.40^a
SS_2G	41.25±0.34^a	38.96±0.42^a	5.53±0.68^b
SS_2M	38.20±0.26^c	35.13±0. 30^c	8.03±0.48^a
Overall Mean	40.19±0.18	37.44±0.21	6.89±0.25

a,b and c Means within each column for each item with different superscripts are significantly different (P≤ 0.05)

TS_1G=Traditional systems one of Gimmizah ,TS_1M=Traditional systems one of Mandarah,SS_2G= Suggested secand systems of Gimmizah , SS_2M= Suggested secand systems of Mandarah .

Table (5). Effect of incubation temperature systems on body weight of post-hatch growing chicks for Gimmizah and Mandarah strains

Traits / Variables	Body weight (g)				
	1day $\bar{x}$±S.E	2wk $\bar{X}$ ±S.E	4wk $\bar{X}$ ± S.E	6wk $\bar{x}$±S.E	8wk $\bar{X}$ ±S.E
TS_1G	39.30±0.34^a	105.90±0.61^c	187.91±3.55^c	379.76±6.99^b	489.32±8.60^b
TS_1M	36.86±0.28^b	114.08±1.29^b	203.45±4.09^{ab}	371.13±8.48^b	458.96±10.18^c
SS_2G	39.24±0.42^a	121.79±1.92^a	214.28±4.93^a	406.07±9.97^a	527.27±13.72^a
SS_2M	35.58±0.30^c	110.97±0.91^b	198.89±3.87^c	394.28±6.45^{ab}	487.40±8.03^b
Overall Mean	37.72±0.18	112.54±0.67	199.95±2.09	387.35±3.99	489.95±5. 01

a,b and c Means within each column for each item with different superscripts are significantly different (P≤ 0.05)

TS_1G=Traditional systems one of Gimmizah ,TS_1M=Traditional systems one of Mandarah,SS_2G= Suggested secand systems of Gimmizah , SS_2M= Suggested secand systems of Mandarah .

Table 6. Effect of incubation temperature systems on body weight gain of post-hatch chicks for Gimmizah and Mandarah strains

Traits / Variables	Body weight gain (g)				
	0 – 2 weeks $\bar{X}$ ± S.E	2 – 4weeks $\bar{X}$ ± S.E	4 – 6 weeks $\bar{x}$±S.E	6 – 8 weeks $\bar{X}$ ±S.E	0 – 8 weeks $\bar{X}$ ±S.E
TS_1G	66.60±0.74[c]	82.01±3.32	191.84±6.28[a]	103.72±5.60[ab]	450.01±8.58[b]
TS_1M	77.25±1.36[b]	88.98±3.87	166.97±6.36[b]	86.61±7.06[b]	422.14±10.17[c]
SS_2G	82.55±1.87[a]	92.49±4.35	191.78±8.95[a]	121.86±8.55[a]	487.62±13.71[a]
SS_2M	75.42±0.90[b]	87.92±3.31	196.07±4.31[a]	92.15±6.85[b]	451.85±7.97[b]
Overall Mean	74.77±0.68	87.35±1.84	187.42±3.33	100.58±3.51	452.15±5.09

a,b and c Means within each column for each item with different superscripts are significantly different ($P \leq 0.05$)

TS_1G=Traditional systems one of Gimmizah ,TS_1M=Traditional systems one of Mandarah.,SS_2G= Suggested secand systems of Gimmizah ., SS_2M= Suggested secand systems of Mandarah .

Tables (7). Effect of incubation temperature systems on feed conversion (g/g) of post-hatch growing chicks for Gimmizah and Mandarah strains

Traits / Variables	Feed conversion (gm feed /gm gain)				
	0 – 2weeks $\bar{X}$ ±S.E	2 – 4 weeks $\bar{x}$±S.E	4 – 6 weeks $\bar{X}$ ± S.E	6 – 8 weeks $\bar{x}$± S.E	0 – 8 weeks $\bar{X}$ ±S.E
TS_1G	3.04±0.02[b]	3.85±0.23	2.54±0.04[b]	5.37±0.11[b]	3.47±0.05[b]
TS_1M	2.79±0.18[b]	3.78±0.17	3.29±0.04[a]	8.76±0.93[a]	4.36±0.13[a]
SS_2G	3.03±0.02[b]	3.88±0.05	2.11±0.09[c]	4.52±1.11[b]	3.16±0.18[b]
SS_2M	3.42±0.01[a]	4.25±0.27	2.04±0.05[c]	5.07±0.59[b]	3.28±0.06[b]
Overall Mean	3.07±0.07	3.94±0.10	2.50±0.15	5.93±0.60	3.57±0.15

a,b and c Means within each column for each item with different superscripts are significantly different ($P \leq 0.05$)

TS_1G=Traditional systems one of Gimmizah ,TS_1M=Traditional systems one of Mandarah,SS_2G= Suggested secand systems of Gimmizah , SS_2M= Suggested secand systems of Mandarah

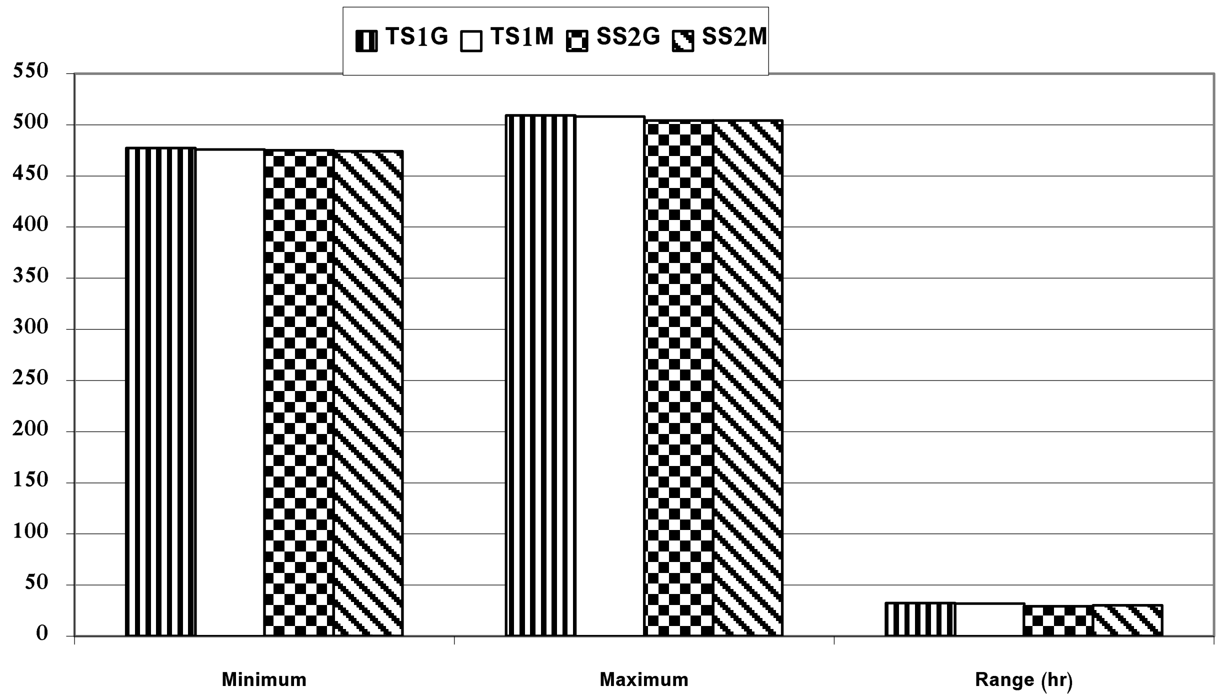

Fig. 1: Effect of incubation temperature on the mimimum and maximum records and the range of hatch time (hr) for chicks of Gimmiza and Mandrah strains.

TS_1G=Traditional systems one of Gimmizah ,TS_1M=Traditional systems one of Mandarah.,SS_2G= Suggested secand systems of Gimmizah ., SS_2M= Suggested secand systems of Mandarah .

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الملخص العربى

تأثير إستخدام نظام لدرجات حرارة التفريخ على صفات التفريخ ونمو الكتاكيت فى سلالات الدواجن المحلية

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أجريت هذه التجربه لدراسة تأثير درجات حرارة التفريخ على بعض صفات التفريخ ونمو الكتاكيت لسلالتين من الدجاج المحلى . تم إجراء هذه التجربه فى محطه بحوث الدواجن بالصبحية – معهد بحوث الانتاج الحيوانى – مركز البحوث الزراعية. أستخدم فى هذه التجربه عدد 1860 بيضة تفريخ من سلالتي الجميزة والمندرة. تم تقسيم البيض التفريخ من كل سلالة عشوائيا على نظامين من حيث إستخدام درجات حرارة مختلفة فى التفريخ.

<u>أولا:-</u> النظام التقليدى والمتبع حاليا حيث تكون درجة حرارة التفريخ ثابتة (5و99ف) طول فترة وضع البيض فى المحضن من صفر – 18 يوم ويتم نقل البيض إلى المفقس تحت درجة حرارة 6و 98 ف وذلك من 18 –20 يوم.

<u>ثانيا:-</u> النظام المقترح وتكون درجة الحرارة فية 2 و 100ف من الفترة 1 – 10 يوم من التفريخ ثم (5 و 99ف) فى الفترة من 11 – 18 يوم من وضع البيض فى المحضن ثم يتم نقل البيض إلى المفقس تحت درجة حرارة 6و 98ف فى الفترة من 18 – 21 يوم من التفريخ . سجل بيض الجميزة والمندرة فقدا فى وزن البيض أعلى معنويا فى النظام المقترح بالمقارنة بالنظام التقليدى وذلك خلال الفترة من صفر – 10 يوم وأيضا فى الفترة من صفر – 18 يوم من التفريخ. وأظهر النظام المقترح أقصر زمن فقس وهو 504 ساعة وذلك لكل من السلالتين. أما نسبة الفقس لعدد البيض الكلى فقد كان أعلى معنويا لسلالة المندرة مقارنة ببيض سلالة الجميزة فى كلا النظامين المطبقين. وسجلت كتاكيت سلالة الجميزة الفاقسة زيادة معنوية فى الوزن عند الفقس مقارنة بسلالة المندرة فى كلا النظامين المتخدمين.وكان وزن جسم كتاكيت الجميزة تحت النظام المقترح أعلى معنويا مقارنة بوزن كتاكيت الناتجة من نفس السلالة تحت النظام التقليدى وذلك عند الأعمار 2و4و6و8و أسابيع . وسجل النظام المقترح زيادة فى وزن الجسم المكتسب لكل من كتاكيت الجميزة والمندرة مقارنة بتلك المنتجة من النظام التقليدى وذلك خلال الفترة من صفر – 8 أسبوع من العمر.أظهرت كتاكيت المندرة للنظام المقترح أفضل كفاءة تحويلية للغذاء وذلك أثناء الأسبوع الأول والثانى من العمر. وعموما أظهرت أحسن نتائج تحققت بالنسبة للكفاءة التحويلية للغذاء لكلا السلالتين للنظام المقترح مقارنة بالنظام التقليدى وذلك أثناء الفترة من 4 -6 و 6- 8 وصفر- 8 أسابيع من العمر.