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The Effect of Iraqians High Environmental Temperature on Growth Performance in Two Lines of Japanese Quail

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Abstract: This study was conducted to investigate the potential effect of Iraqians High Environmental Temperature on Growth Performance in two lines of Japanese quail. Four-hundred eighty mixed 1-day old chicks were randomly assigned to 12 replicates of 20 chicks per replicate for each strain. The birds were exposed to ambient Iraqi environmental conditions. The average daily high temperature during the experimental period, averaged 30°C ranging between 24-36°C. The results showed that there was Brown strain had higher body weight than those white strain. Feed intake level of White strain and Brown strain and gain day less body weight and had significantly ($p \leq 0.05$) poorer FRC. The mean values of dry matter, protein and ash in breast and thigh quail meat were not influenced by different strains, fat and free water content in breast and thigh meat were significantly higher ($p \leq 0.05$) in Brown strain than those of White strain.

Key words: Japanese quail, environmental temperature, body weight

INTRODUCTION

Japanese quail, have received less attention relative to other livestock species, although estimation of such parameters for many traits have been reported (Kirkpinar and Oguz, 1995; Oguz *et al*., 1996). High ambient temperature are a problem in poultry industry worldwide. Heat Stress has been associated with decrease body gain, feed intake, feed efficiency, growth speed, productivity, hormonal and molecular changes (Etches *et al*., 1995; Hargreaves, 1996; Sahin *et al*., 2005). Teeter *et al*. (1985) reported lower retention rates for minerals in broilers raised at high cycling ambient temperature. The success of quail breeding mostly depends on the environmental conditions should be arranged as required (Ozbey and Ozcelik, 2004). The most of the problems occurred in breeding period is related to those insufficiently taken measurers. Such mentioned problems have been noticed at the top level in countries (Okan, 1999; Ozbey and Ekmen, 2000) and the regions taking part at tropical climate zones and those measures are mostly requiring the highest expenditures to be included in significant investments (Poyraz *et al*., 1991). Variation within and among population provide the basis for development of selection strategies. Defined and categorized traits and estimated parameters provide an opportunity to develop the desired characteristics (Siegel and Dunnington, 1997; Schuler *et al*., 1998; Ozbey and Ekmen, 2000). In this study, it was researched to find out, some performance traits meat composition in two strains of Japanese quails (Brown and White) that were bred in high cycling ambient temperature (24-36°C).

MATERIALS AND METHODS

This experiment was conducted at College of Agriculture/Tikrit University, from, 1 June to 5 July, 2006, to study the growth, carcass traits and meat composition in two strains of Japanese quails, namely Brown and White quails. Four-hundred eighty mixed 1-day old chicks, raised in cages (75 x 75 x 75) cm under constant light period of 23 h. The birds were exposed to ambient Iraqi environmental conditions. The average daily high temperature during the experimental period, averaged 30°C ranging between (24-36°C). Relative humidity was between (45-50%). Feed and water were available for *ad libitum* consumption at all times. Rations utilized were formulated to provide the requirement for essential nutrients specified by the (NRC, 1990) Table 1. The birds were randomly assigned to 12 replicates of 20 chicks per replicate for each strain. Individual bird body weight and feed consumption (by cage) were recorded at 1, 2, 3, 4 and 5 wk. of age. Mortality were recorded as they occurred and weights were included for calculation of Feed Conversion Ratio (FRC).

The live weight measures were done with the electronic scale in basis of 0.01 g. At the end of experiment, three males and three females per replicate were randomly selected for slaughter. The bird were taken off feed and water for 6 h for processing. Immediately, whole, ready to cook carcass were then chilled for 2 h in ice water bath, After the chilling period, each carcass was processed in to, front and rear halves by separating behind the seventh rib and between the notarium (thoracic vertebra) and the synsacrum (lumbar vertebrae). Front half weight, Lear half weight, were recorded. Brest and thigh meat were wrapped individually in polyethylene bangs and immediately placed in freezer (-18°C). Frozen meat was thawed for 24 h in a refrigerator (4°C) prior to chemical analysis meat was sported from the bone and skin and then mixed thoroughly for homogeneity. The sample of meat were analyzed for moisture, fat, protein and ash contents according to (AOAC, 1990).

Table 1: Ingredients and calculated composition of the basal diet (%)

Ingredients and composition	(%)
Yellow corn	18.00
Barley	32.00
Wheat brain	6.00
Rice brain	13.00
Soybean meal (44% CP)	18.10
Meat meal (50% CP)	10.00
Premix (Vitamin Mineral)*	0.10
Limestone	1.60
Dicalcium phosphate	1.00
Salt (NaCl)	0.20
Calculated composition	
Metabolizable energy (kcal/kg)	2608.00
Crude protein (%)	22.30

*Premix supplied for 2 kg: vitamin A, 15000 IU; cholecalciferol, 3 IU, vitamin E 15 IU; menadione, 2.5 mg; vitamin B1, 1 mg vitamin B2, 10 mg; niacin, 70 mg; d-pantothenic acid, 20 mg; vitamin B12, 4 mg; folic acid, 2 mg; biotin, 0.1 mg; Mn, 80 mg; Fe, 25 mg; Zn, 50 mg; Cu, 7 mg; Iodine, 0.3 mg; Se, 0.15 mg; choline chloride, 350 mg

The data collected on various parameters were subjected to statistical analysis as methods suggested by Snedecor and Cochran (1989). Angular transformation was applied to percentage wherever needed before carrying out statistical analysis.

RESULTS AND DISCUSSION

Data on mean of live body weight g/bird of Brown and White Japanese quail strains, are presented in Table 2. The results showed that there was Brown strain had higher body weight than those white strain at 2, 3, 4 and 5 wk of age ($p \leq 0.05$). Strain effect upon body weight at different ages is reported by numerous authors (Oguz *et al*., 1996; Minvielle *et al*., 1999; Almeida *et al*., 2002). Feed intake level of White strain and Brown strain (570 vs 554) gm. gain day less body weight and had significantly ($p \leq 0.05$) poorer FRC (3.1 vs. 2.8) respectively Table 3. The results obtained for this variable and those for mean body weight seem indicative that the Brown male has a better capacity of feed utilization, as it presented a higher growth, although consuming less for each g of body weight. This observation is in agreement with the results reported by (Marks, 1993; Almeida *et al*., 2002). The mortality for the two strain, were found to be 5% and 5.4% for White and Brown strains respectively. Although overall mean were not different significantly.

The mean values of composition contents of breast and thigh of quail meat are given in Table 4. The mean values of dry matter, protein and ash in breast and thigh quail meat were not influenced by different strains. The present results were higher than those given by some other researchers (Caron *et al*., 1990; Yalcin *et al*., 2005). Fat and free water content in breast and thigh meat were significantly higher ($p \leq 0.05$) in Brown strain than those of White strain (3.8 vs. 1.6)% and (6.1 vs. 3.8)% respectively.

Table 2: Mean±SE of live body weight (gram/bird) of two strain Japanese quail growth to 5 weeks of age

	Strain	
Age week	Brown	White
1	21.30	20.92
2	58.98*	51.24
3	110.82*	99.37
4	158.11*	147.49
5	195.42*	186.14

*Means with different superscripts in the same raw are significantly ($p \leq 0.05$) different

Table 3: Mean final body weight (gram/bird), carcass yield % carcass traits and feed intake gram in two strain Japanese quails

	Strain	
Performance parameter	Brown	White
Final BW (g)	190.52*	180.69
Carcass yield (%)	67.90	64.10
Front half PWB1	40.10	37.20
Rear half PWB	27.16	26.90
Fat pad PWB	0.57*	0.28
Feed intake (g)	554.00	570.50
FRC 2	2.80	3.10*
Mortality	5.40	5.00

*Means with different superscripts in the same raw are significantly ($p \leq 0.05$) different. 1 = Percentage of live body weight. 2 = Feed conversion ratio

Table 4: Chemical analysis of breast and thigh of Japanese quail male at 5 weeks of age

	Breast		Thigh	
Items (%)	Brown	White	Brown	White
Dry matter	32.04	31.71	33.19	33.33
Protein	25.12	27.21	25.09	27.35
Fat	3.80*	1.61	6.10*	3.80
Ash	2.11	1.89	2.00	2.18
Free-Water	24.17*	20.38	20.19*	16.98
Moistness	67.96	68.29	66.91	66.67

*Means with different superscripts in the same raw are significantly ($p \leq 0.05$) different

However, similar, lower and higher results were found in the literature (Darden and Marks, 1985; Oguz *et al*., 1996; Christaki *et al*., 1997). There are several explanation for these differences, breed, sex and diet, could have significant effects on the carcass.

There were significant differences ($p \leq 0.05$) Between Brown and White strains in carcass yield, front half, rear half and fat pad. Such obtained results is in dis agreement with the findings that carcass traits, not differ significantly between Brown and White strains when calculated as a percentage of live body weight (Genchev *et al*., 2005).

As a conclusion, our finding together with other, Ozbey and Ozcelik (2004) suggested that the small size animal are affected with such high environmental temperature less than the other big size ones. The reason of this fact

is that the size of body surface is playing a significant role in temperature loss through particularly radiation and convection ways. While the size of the animal becomes bigger the body surface per unit weight becomes smaller, therefor reducing the negative effect of the high ambient temperature in Japanese quail probably be explained by this fact.

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