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PERFORMANCE OF JAPANESE QUAIL UNDER TWO SYSTEMS OF MANAGEMENT

(With 3 Tables & 1 Fig.)

By

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الكفاءة الانتاجية للسمان الياباني تحت تأثير نوعين من الرعاية

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أجريت الدراسة لمقارنة الكفاءة الانتاجية للسمان الياباني تحت ظروف تربية البطاريات والتربية الأرضية الطليقة ، أستخدم لهذه الدراسة مجموعتين من طيور السمان كل مجموعة مكونة من ٢٠٠ طائر المجموعة الأولى تم رعايتها في بطارية متعددة الطوابق (٤ طوابق) بمساحة ٨٦ × ٨٤ سم لكل طابق والمجموعة الثانية تم اسكانها في حظيرة ٣٠٥ × ٢٤٤ والمساحة المتاحة لكل طائر كانت ١٣١ سم و ٣٧٢ سم على الترتيب وتم تسجيل الوزن الحي وكمية العليقة المستهلكة أسبوعيا ولمدة ٦ أسابيع أسفرت النتائج عن وجود اختلافات معنوية في معدلات الأوزان عند الأسبوع الأول والثاني والثالث والرابع من العمر وكذلك نسب التحويل الغذائي في الأسبوع الأول والثاني والثالث والخامس كما لوحظ وجود زيادة غير معنوية في معدل استهلاك العليقة في المجموعة الطليقة عن المجموعة المكثفة كما لوحظ أيضا وجود علاقة ارتباط معنوية بين كل من درجة الحرارة ونسبة الرطوبة ووزن الطيور ومعدل استهلاك الغذاء ٠ مما تقدم نجد أن طائر السمان تتحسن انتاجيته تحت ظروف التربية المكثفة عن التربية الطليقة ٠

SUMMARY

A trial to study the effect of housing and microclimatic condition on the performance of two groups of Japanese quail. The first group was intensively housed in multidecked quail rearing battery of 86x84 cm cages. The second group was freely housed i a 305x244 cm. Pen space area was calculated as 372 cm^2/bird and 131 cm^2/bird for floor and cage rearing birds respectively. The two groups were fed on the same diet ad libitum up to 6th week. Body weights, feed intake were recorded weekly. The weekly decrement of temperature was 2°C and 3°C in floor pen and cages respectively. Significant differences were observed in body weight at 1, 2, 3 and 4 weeks of age ant at 1, 2, 3, and 5 weeks of age for feed conversion. However, no significant differences in feed intake were recorded. On the other hand, both ambient temperature and relative humidity were significantly correlated with body weight and feed intake.

INTRODUCTION

The environmant upon which the poultry kept for productive purposes has changed remarkedly since the early part of this century (CRAIG, 1982). Multiple chick cages have essentially replaced floor pens. NORTH (1984) estimated that 75% of all commercial chickens in the world are now kept in cages. Nevertheless, there is little quantitative data available comparing the effects of either cage or floor rearing of quails on their subsequent performance.

It appears that chickens and other animals prefer familiar over novel environments (BEILHARZ, 1982). CLARK and GALEF (1981) reported that birds reared in open cages rather than in a more natural environment, has faster growth and earlier sexual maturity. Therefore, quail that kept in high density cages during rearing period may benefit from being reared in such environment. REECE, et al. (1971) and LEESON and SUMMERS (1985) found that broilers reared in cages were heavier than those reared in floor pens.

It is well documented that the microclimatic condition to which birds are exposed will affect their appetite and growth. High environment temperatures depresses feed intakes and body weight gain of broilers (McNAUGHTON and REECE, 1984 and HULAN and PROUDFOOT, 1987).

The reduction in feed intake introduced by elevated environmental temperature and subsequent changes in house humidity, creates deficiencies of most, if not all nutrients essential for optimal performance. Although the effects of high environmental temperatures are well documented, there is only limited information on the effect of medium and low environmental temperature on the performance of poultry stocks.

The primary objectives of this study were to test whether cage and floor pen rearing of Japanese quail would cause: 1) differences in variance and means of body weight, gain feed consumption and feed conversion, 2) Differences in ambient temperatures and relative humidity inside the housing systems and their influence on performance of birds during rearing period.

MATERIAL and METHODS

Rearing Period:

Day-old Japanese quail chick hatched at poultry and Rabbit project, Department of Animal Husbandry, Fac. Vet. Med., Alexandria University were reared in a naturally ventilated brooding-rearing house containing 305x244 cm floor pens and 86x84 cm multidecked quail rearing battery. Pens floor were concrete covered with 5-7.5 cm of chaffed wheat straw litter. In the first week all floors covered with brooding paper to prevent slipping of legs especially in wire mesh floor of the cage. A quail starter diet calculated to contain 27.3% crude protein and 3066 kcal metabolizable energy was provided ad libitum throughout the experiment. Water, supplied ad libitum contained a soluble vitamins, electrolyte mixture until day 14.

Feed was provided in a flat paper plates in first week, later a plastic feeder flats of 5 cm high and 0.6 cm lip were provided in floor pen. A 78 cm straight type feed trough attached to the front of the cage was used to provide feed in cages. A jar waterer and two small cup waterers were also present initially in each cage. Similar feeding and watering equipments in appropriate numbers were available for the floor and cage birds in the first week. Three quail chick founts were provided initially and gradually replaced on Day-7 with three 3-7 L founts in each pen.

The space area were 131 cm and 372 cm for cage and floor reared quail respectively. One pen contain 200 birds and one quail rearing battery of 4 cages each contain 55 birds were utilized in this experiment.

Body weights and feed intake were recorded weekly up to 6 weeks of age. The average initial body weight of chicks under investigation was similar (7.67 g) in the two systems. To study the effect of temperature a regime test of a constant weekly decrease in temperature was performed. The weekly decrement in ambient temperature inside house were 2°C and 3°C for cages and floor reared birds respectively.

The statistical analysis was utilized. Statistical Analysis System (SAS, 1985).

RESULTS

Results were summarized in Tables 1, 2 and 3 and Figure (1). The results presented in Table (1) and Fig. (1) showed the effect of housing system on body weight devepolment, feed intake and feed conversion. The results of least square analysis (Table 2) showed the effect of housing, ambient temperature and relative humidity on body weight, feed intake and food conversion of Japanese quail. Table (3) showed the phenotypic correlation between both ambient temperature and relative humidity with body weight, feed intake and feed conversion of Japanese quail.

DISCUSSION

In this experiment, convincing evidence of differences in quaility of cage and floor-pen rearing environments, were based on the criteria of body weights, feed intake and food conversion.

Body Weight Develpment:

The results of least square analysis (Table 2) revealed that there was a significant difference (P/ 0.01) in body weight of Japanese quail reared under cage system. These results agree with REECE, et al. (1971), LEESON and SUMMERS (1985) and JIN and CRAIG (1988).

In comparisons the development of body weight in free housed (floor pens) and intensively housed (Cages) quail within the corresponding period age it has been found that there were significant differences in 1, 2, 3 and 4 weeks of age. However, a non-significant increased body weight at 5th and 6th weeks, for intensity housed birds. Moreover, IBRAHIM (1990) also reported the same results in Pekin ducklings.

Feed Intake:

No significant variatios were recorded concerning feed intake between intensive and free housed quail, (Table 2). Although the intensively housed quails consume less amount of feed during the rearing period, they gain greater weight (P/ 0.01) than the freely housed birds. From the behavioural observations reported by the author in the previous paper that the floor-reared quail seemed more likely to waste feed by scratching at the feed or jumping into or out the trough. These observations may explain that why the floor-reared quails used more feed but did not gain more weight, except at the 6th week in which they gain nearly equal weights. BLOCKHUIS and VANDER (1989) and LEE and CRAIG (1990) also reported that part of the lower feed to gain ratio was caused by less feed wastage.

Feed Conversion Ratio:

A significant decrease (P/ 0.05) in the values of feed conversion ratio was recorded in intensively housed quail at 1, 2, 3 and 5 weeks and non-significant decrease for the rest weeks in comparisons with floor reared birds. The better feed to gain ratio observed in the intensively housed group compared to freely housed group, might be attributed to the minimized feed wastage of food resulted from scraching of feed by legs or jumping into or out the trough. These obtained results coincide those obtained by KOELKEBECK, et al. (1987).

While differences between cage and floor-reared quail not all significant for the investigated traits, there was a trend for all production traits to increase as the population size increased. Perhaps the management conditions upon which the birds reared survived, preferred more subtle differences between treatments.

Microclimatic condition:

Protection from hot, humid and cold environment is necessary for bird health and production, since they can upset the metabolic processes. The results of least suare analysis (Table 2) revealed that there was a highly significant ($P \leq 0.01$) effect of ambient temperature on body weight. With an increased ambient temperature, heat production correspondingly lowered, resulting in upset of the metabolic process which can lead to a decrease in body gain. These phenomena partly explain the variations in body weight noticed in the present investigation. However, the different weekly decrements in ambient temperature had significant effect on feed intake (Table 2). The intensively housed birds consumed increased quantities of feed inspite of the higher ambient temperature. A plausible explanation for this effect is that considerable part of feed was wasted by the general motor behaviours of these birds, which reflects an unactual increase in feed intake. These results were in agreement with the findings of HULAN and proudfoot (1987).

On the other hand, the interaction of temperature and relative humidity constituents a considerable climatic stress on domestic birds. The moisture content of the air has a pronounced significant ($P \leq 0.01$) effect on body weight of quail chicks (Table 2). Since the relative humidity, influences the evaporative heat loss, which is potentially one of the most important channels of extraction of surplus body heat, it would be reasonable therefore to suppose that it has a significant effects on the performance of the birds. These results are in agreement with those obtained by NORTH (1978) and HULAN and PROUDFOOT (1987) however, a contradictory opinion was reported by DRAGOVICK (1979).

The data presented in Table (3) revealed a negative and significant ($P \leq 0.01$) correlation between both ambient temperature and relative humidity with data of each of body weight and feed intake. It seems clear therefore from the above mentioned investigations and supporting arguments That the relative contribution of the major component of environmental conditions, that command our particular attention, must be optimized to develop potential of confined birds through ventilation, protection against extreme weather, excessive watering, feeding and methods of husbandry. In general, changes in poultry husbandry through good housing and management can probably facilitate acclimatization and physiological adaptation for the benefit of birds health and productive performance.

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Table (1)

Body weigh development, feed intake feed conversion, ambient temperature and relative humidity in floor reared and caga-reared quail

Age Weeks	Floor reared birds					Cage reared birds				
	Body weight (g)	Feed intake (g/day)	Feed conversion (g.feed/g. gain)	Ambient temperature	Relative humidity(%)	Body weight (g)	Feed intake (g/day)	Feed conversion (g.feed/g. gain)	Ambient temperature	Relative humidity(%)
1	14.43±0.49	3.6	3.68±0.26	36.0	64	10.04±0.49 **	3.1	2.66±0.1 **	36.0	63
2	22.59±1.56	5.6	7.05±1.39	34.0	60.3	20.79±0.79 **	3.74	2.72±0.34 **	33.0	66.2
3	35.21±2.44	9.0	6.45±1.23	32	50.0	45.77±2.55 **	8.2	3.11±0.41 **	30.0	58
4	54.85±4.23	9.5	4.19±0.70	30	55.0	66.17±3.42 **	8.9	3.45±0.43	27.0	55
5	81.13±5.33	16	4.91±0.71	28	55.0	89.63±3.44	11.1	3.61±0.36 *	24.0	51.2
6	110.4 ±7.02	18	4.94±0.82	26	54.0	110.2 ±2.89	16.0	5.65±0.36	21.0	49

* Significant at level P<0.05
** Significant at level P<0.01

Table (2): Least square analysis of the effects of housing, ambient temperature and relative humidity on body weight, feed intake & feed conversion.

S.O.V.	D.F.	Body weight	Feed intake	Feed conversion
Housing	1	186.99**	17.80	26.22*
Ambient temperature	5	255.67**	264.68**	6.64
Relative humidity	5	245.73**	272.12**	2.07
Experimental error	14	3.99	5.27	5.50

** Significant at level (P < 0.01) S. O. V. Source of variance
* Significant at level (P < 0.01) D. F. Degree of freedom

Table (3): Correlation coefficient between both ambient temperature and relative humidity with body weight, feed intake and feed conversion.

	Body Weight	Feed Intake	Food Conversion
Ambient temperature	-0.94**	-0.96**	-0.15N.S.
Relative Humidity	0.89**	0.90**	-0.08N.S.

** Significant at level P<0.01
N.S. Non Significant

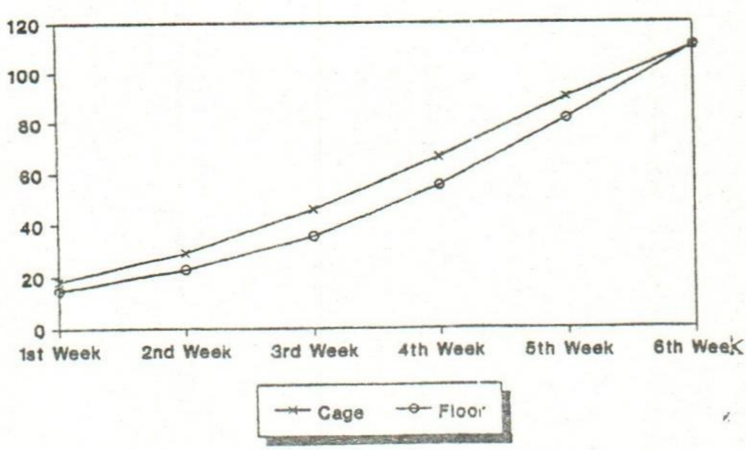

Fig.(1) Body weight development for cage and floor reared quail.