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EFFECT OF SOME NON-GENETIC FACTORS ON SOME CARCASS TRAITS IN JAPANESE QUAIL

By

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Abstract: *A total number of 54 of Japanese Quail were chosen randomly at 22 weeks of age from the three mating system groups, three sex ratio groups and three parental age groups slaughtered to study the effect of these non – genetic factors on some carcass traits in Japanese quail. The results obtained can be summarized as follow:*

Effect of mating systems: *Dressing percentage increased significantly from the range of (60.01-63.56 %) in the slaughters produced from full and half–sib matings to the rang of (65.11-66.16 %) in the slaughters produced from random mating. Similar trend was observed for meat and giblets percentage, while, the reverse trend was observed for the bone percentage.*

Effect of sex ratio: *Dressing percentage increased significantly from the range of (59.02-63.11%) in the slaughters produced from 1:2 and 1:3 sex ratios to the range of (63.71-64.91%) in the slaughters produced from 1:1 sex ratio. Similar trend was observed for meat and giblets percentage, On the other hand, the reverse trend was observed for bone percentage.*

Effect of parental age: *Dressing percentage increased significantly from the range of (62.01-64.11%) in the slaughters produced from parents aged 16, 22 weeks to the range of (66.18-66.41%) in the slaughters produced from parents aged 10 weeks. Similar trend was observed for meat and giblets percentage, but, the reverse trend was observed for bone percentage.*

INTRODUCTION

Research work in poultry is often handicapped by limits in budget, time and space. Some of these problems might be alleviated by using Japanese quail as a pilot animal for breeding research (Wilson et al, 1961). However, its comparability with the domestic fowl must be better

understood if the full potential of the quail is to be realized.

Quail is the smallest avian species raised for meat and egg production. (Panda and Singh, 1990) and it has also assumed world wide importance as a laboratory animal (Baumgartner, 1990). Distinct characteristics include rapid growth, enabling quail to be market for consumption at 5-6 weeks of age, early sexual maturity resulting in a short generation interval, high rate of lay and much lower feed and space requirements than the domestic fowl. Furthermore, quail could be considered a good and economical source for animal protein because its meat contains 22.8% protein in breast and 19.6% in the fumier. Therefore, countries having shortage in animal protein, such as in Egypt can depend on quail to compensate a part of this shortage.

Setting quail eggs before 10 weeks and after 22 weeks of age should avoided to get high economic productivity from the quail. This observation is consider a very important for two reasons, the first because the gradually decline occur in egg weight, hatch weight, fertility and hatchability percentages after 14 weeks of age, which consider the maximum rates of these traits were observed around 14 weeks of age. The second, is the parents flock at age 22 weeks can be slaughtered and the meat produced at this age was profitable for the consumer than the meat produced at later ages after 22 weeks.

The present study was undertaken to study the effect of some non-genetic factors (mating systems, sex ratios and parental ages) on some carcass traits in Japanese quail.

MATERIALS AND METHODS

Data of the present study were collected on the flock of Japanese quail (Coturnix coturnix japonica) maintained by the Department of Animal Production, Faculty of Agriculture, Al-Azhar University, Cairo, Egypt. during the period from October 2002 until May 2003.

Breeding plane and management:

A total number of 288 birds (96 males and 192 females) at 6 weeks of age were taken at random from the flock under consideration as the parents of the present study. The mating system in the base population was in a ratio of one male to two females avoiding full and half-sib matings. The mating system used in the present study were random mating (R.M), full-sib mating (F.S) and half-sib mating (H.S).While, the sex ratio used were (1:1), (1:2) and (1:3) male : females. More detail for management of the flock were described by Abdel–Mounsef, (2005).

Measurements:

From each mating system, sex ratio and parental age groups studied, six birds (3 males and 3 females) were chosen randomly at 22 weeks of age to determine weights of all parts of carcass and its organs. Birds chosen were stowed for 3 hours, weighted and then slaughtered. Feather was removed by the dry method, and then carcass was eviscerated. The following carcass traits were recorded:

Body weight at slaughter age (22 weeks) in grams, carcass weight as well as weight of the edible giblets (heart, liver and empty gizzard) were recorded to the nearest 0.1 gm. Dressing percentage (D.P%), Meat percentage (Meat %), bone percentage (bone %) and giblets percentages (giblets %) were calculated.

Statistical analysis:

Statistical analysis were conducted using the General Linear Models (GLM) procedure of base SAS software (SAS Institute, 1998). Differences between each two means were done according to Duncan's Multiple Range Test. Prior to analysis the data taken for all percentages were transformed using arc-sin transformation. After analysis, means were re-transformed to the original values.

RESULTS AND DISCUSSION

Effect of mating system:

Edible and inedible giblets:

Results obtained in figure (1 & 2) indicate that average meat, bone, and giblets % through different mating systems i.e. random (R.M), full-sib (F.S) and half–sib (H.S) matings in males and females, respectively. The present estimates for meat, bone and giblets % was in agreement with those reported by Mousa (1993), who estimated meat, bone and giblets percentage as 46.64, 11.47, 6.37% in males and 47.31, 11.52, 6.64% in females.

Table (1) cited the least square means of carcass traits studied, however meat percentage increased significantly ($P<0.01$ or $P<0.05$) from 43.12% for carcasses produced from F.S mating to 45.09, 47.88% for carcasses produced from H.S and R.M matings. Similar trend was observed for giblets percentage. The estimates were 6.06 % for F.S mating increased to 6.72, 6.86% for H.S and R.M matings, while bone % decreased significantly ($P<0.01$ or $P<0.05$) from 12.96 % for carcasses produced from F.S mating to 12.01, 11.68 % for carcasses produced from H.S and R.M mating systems.

The carcasses of females was produced higher meat and giblet percentage than those produced form carcasses of males by 3.85, 13.91% and produced lower bone % than males estimated by 8.17% . The same trend was observed by Mousa (1993) who reported that female carcasses were higher by 1.41, 4.24% in meat and giblet percentage than male carcasses and lower by 1.91% in bone %. Mohammed (1990) reported similar trend in case of giblets percentage, where the females had higher percentage of giblets than males. On the contrarily, he reported that meat percentage in male carcasses was higher by 4.60% than in female carcasses.

Dressing Percentage:

Results obtained in figure (1 & 2) indicate that average dressing percentage through different mating systems i.e R.M, F.S and H.S matings of males and females, respectively. The present estimates for dressing % fall within the range of 59.3 to 77.00% for the two sexes as reported by Jones et al (1979); Bacon and Nestor (1983); El- Fiky (1991); Kosba et al, (1992); Mousa (1993) and El–Full et al, (2001). The carcasses produced from random mating were given dressing percentage higher than those produced from full and half-sib matings by 8.50, 3.58% in males and heavier by 8.10, 4.91 % in females.

Table (1) cited the least–square means of dressing percentage which increased significantly ($P<0.01$ or $P<0.05$) from 55.02% for carcasses produced from full-sib mating to 59.78 and 62.12% for carcasses produced from half-sib and random matings. The carcasses of females were produced higher dressing percentages than those produced from carcasses of males by 4.85%, respectively.

Effect of sex ratio:

Edible and inedible giblets:

Results obtained in figure (3 & 4) indicate that the average meat, bone and giblets percentages through different sex ratios used among mating parents (1:1, 1:2 and 1:3) in males and females, respectively.

The carcass produced from (1:1) sex ratio were given meat percentages higher than those produced from 1:2 and 1:3 sex ratios by 2.55, 6.93% in males and 3.55, 7.08 % in females. The corresponding estimates for giblet percentages were higher by 2.71, 9.66 % in males and 4.84, 7.92 % in females, while the carcasses produced from (1:1) sex ratio were given bone percentages lower than those produced from 1:2 and 1:3 sex ratios by 1.27, 6.26 % in males and 3.75, 5.74 % in females.

Table (2) cited the least–square means of carcass traits studied,

however meat percentage increased significantly (P<0.01 or P< 0.05) from 44.76% for carcasses produced from sex ratio 1:3 to 46.18, 47.02% for carcasses produced from sex ratios 1:2 and 1:1, respectively. Similar trend was observed for giblet percentage. The estimates were 6.11% for (1:3) sex ratio increased to 6.52 and 6.71 % for sex ratios 1:2 and 1:1, while bone percentage decreased significantly (P<0.01 or P<0.01) from 12.17 % for carcasses produced from sex ratio 1:3 to 11.98, 11.56% for carcasses produced from sex ratios 1:2 and 1:1.

Dressing percentage:

Results obtained in figure (3 & 4) indicate that average dressing percentage through different sex ratios used among mating parents (1:1, 1:2 and 1:3) of males and females, respectively. The carcasses produced from (1:1) sex ratio were given dressing percentages higher than those produced from 1:2 and 1:3 sex ratios by 2.58, 7.95% in males and 2.77, 7.48% in females.

Results in table (2) indicate the least–square means of dressing percentage which increased significantly (P<0.01 or P<0.05) from 59.13% for carcasses produced from (1:3) sex ratio to 61.01, 62.78% for carcasses produced from 1:2 and 1:1 sex ratios. The carcasses of females were produced higher dressing percentages than those produced from carcasses of males by 4.65%.

Effect of parental ages:

Edible and inedible giblets:

Results obtained in figure (5 & 6) indicate that average meat , bone and giblets percentages through different parental ages i.e.10, 16 and 22 weeks of males and females, respectively. The carcasses produced from parents aged 10 weeks were given meat percentages higher than those produced from parents aged 16 and /or 22 weeks by 2.29, 6.74 % in meals and 2.61, 6.35 % in females. On the other hand, the carcasses produced from parents aged 10 weeks were given bone percentages lower than those produced from parents aged 16 and 22 weeks by 3.60,6.72 % in males and 3.59,6.53 % in females . The same trend was observed by Choudhary and Mohadevan (1983), they reported dressing percentages ranged between 62.19 to 65.48 % for males and between 58.90 to 62.14 % for females.

Table (3) cited the least–square means of carcass traits studied, however meat percentage increased significantly (P<0.01 or P<0.05) from 40.83 % for carcasses produced from parents aged 22 weeks to 45.36, 48.18 % for carcasses produced from parents aged 16 and 10 weeks. Similar trend

was observed for giblet percentages, where the estimates were 6.02 % for carcasses produced from parents aged 22 weeks increased to 6.22, 6.72 % for carcass produced from parents ages 16,10 weeks. While, bone percentage decreased significantly ($P<0.01$ or $P<0.05$) from 12.61 % for carcasses produced from parents aged 22 weeks to 12.02, 11.30 % for carcasses produced from parents aged 16 and 10 weeks.

The carcasses of females were produced higher meat and giblet percentages than those produced from carcasses of males by 3.54, 3.74 % and produced lower bone % estimated by 3.00 %. The same trend was observed by Mohammed (1990) and Mousa (1993), they reported that carcasses of females had higher meat and giblet % and lower bone % than carcasses of males. Choudhary and Mahdevan (1983), reported that sex had significant effect on carcass traits for carcasses produced at different parental ages.

Dressing percentage:

Results obtained in figure (5 & 6) indicate that average dressing % through different parental ages i.e.10, 16and 22 weeks of age of males and females, respectively. The carcass produced from parents aged 10 weeks were 3.60, 7.92% in males and 3.59, 6.53% in females heavier than those produced from parents aged 16 and / or 22 weeks for dressing percentage.

Table (3) cited the least–square means of dressing percentage which increased significantly ($P<0.01$ or $P<0.01$) from 57.18 % for carcasses produced from parents aged 22 weeks to 60.82, 63.81 % for carcasses produced from parents aged 16 and 10 weeks. The carcasses of females were produced higher dressing percentage than those produced from carcasses of males by 3.20%. The same trend was observed by Mousa (1993) who reported that carcasses of females had higher dressing % than those of males .

Table (1): least–square means of factors affecting carcass trait studied through different mating systems.

Independent Variables	Trait				
	No.	Meat %	Bone %	Giblets %	Dressing %
Mating Sys.					
R.M.	18	47.88 ^{a}	11.68 ^{a}	6.86 ^{a}	62.12 ^{a}
F.S.	18	43.12 ^{b}	12.96 ^{b}	6.06 ^{b}	55.02 ^{b}
H.S.	18	45.09 ^{a}	12.01 ^{a}	6.72 ^{a}	59.78 ^{a}
Sex:					
Male	27	45.18 ^{a}	12.22 ^{a}	6.32 ^{a}	60.21 ^{a}
Female	27	46.90 ^{b}	11.76 ^{b}	6.98 ^{b}	63.01 ^{b}

a, b : Means in the same column under the same effect with different superscripts are significantly ($P<0.01$) differ.

Table (2): least–square means of factors affecting carcass traits studied through different sex ratios.

Independent Variables	Trait				
	No.	Meat %	Bone%	Giblets%	Dressing%
Sex ratios					
1:1	18	47.02 ^{a}	11.56 ^{a}	6.71 ^{a}	62.78 ^{a}
1:2	18	46.18 ^{a}	11.98 ^{a}	6.52 ^{a}	61.01 ^{a}
1:3	18	44.76 ^{b}	12.17 ^{b}	6.11 ^{b}	59.13 ^{b}
Sex:					
Male	27	46.18 ^{a}	12.18 ^{a}	6.11 ^{a}	60.01 ^{a}
Female	27	47.96 ^{b}	11.26 ^{b}	6.96 ^{b}	62.92 ^{b}

a, b : Means in the same column under the same effect with different litters are significantly ($P< 0.01$) differ.

Table (3): Least–square means of factors affecting carcass traits studied through different parental ages.

Independent Variables	Trait				
	No.	Meat %	Bone %	Giblets %	Dressing%
Parental ages:					
10 weeks	18	48.18 ^{a}	11.30 ^{a}	6.72 ^{a}	63.81 ^{a}
16 weeks	18	45.36 ^{a}	12.02 ^{a}	6.22 ^{a}	60.82 ^{a}
22 weeks	18	40.83 ^{b}	12.61 ^{b}	6.02 ^{b}	57.18 ^{b}
Sex:					
Male	27	44.33 ^{a}	12.36 ^{a}	6.41 ^{a}	60.92 ^{a}
Female	27	45.90 ^{b}	12.00 ^{b}	6.65 ^{b}	62.87 ^{b}

a, b : Means in the same column under the same effect with different litters are significantly ($P<0.01$) differ .

Figure 1. The effect of mating system on some carcass traits in males of Japanese Quail.

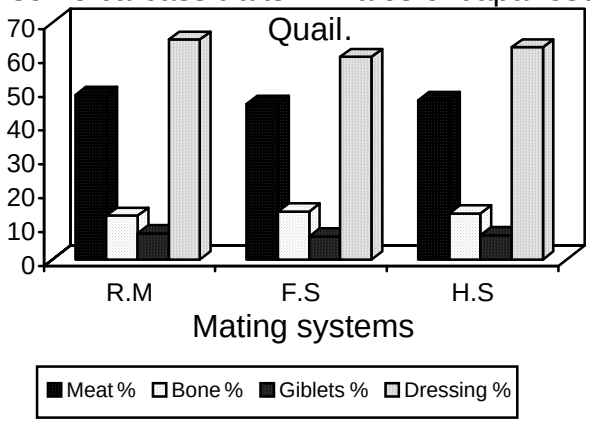


Figure 2. The effect of mating system on some carcass traits in females of Japanese Quail.

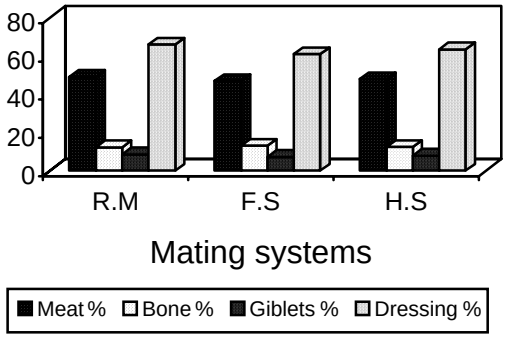


Figure 3. The effect of sex ratios on some carcass traits in males of Japanese Quail.

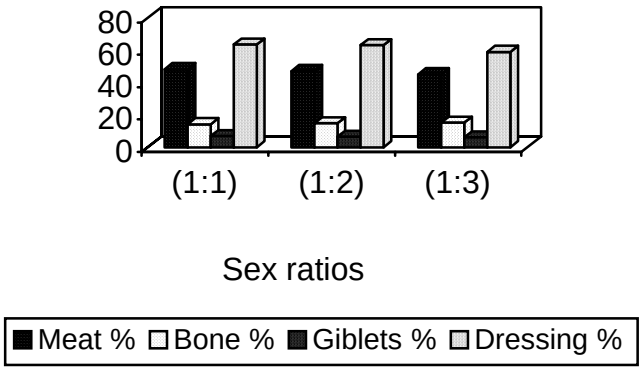


Figure 4. The effect of sex ratios on some carcass traits in females of Japanese Quail .

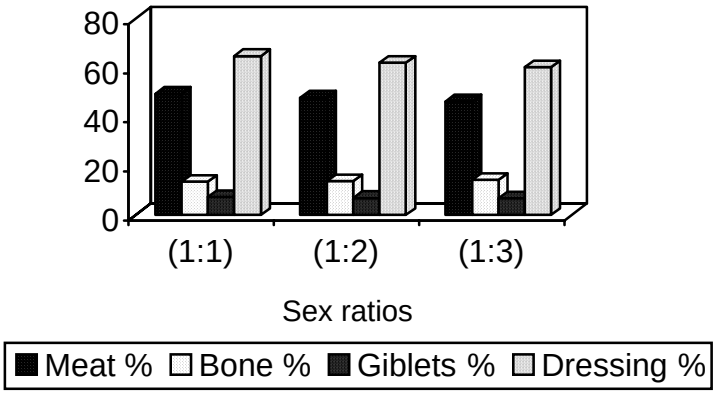


Figure 5. The effect of parental ages on some carcass traits in males of Japanese Quail.

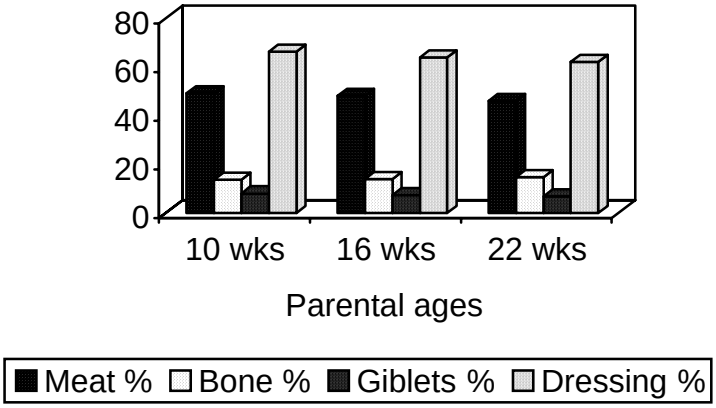
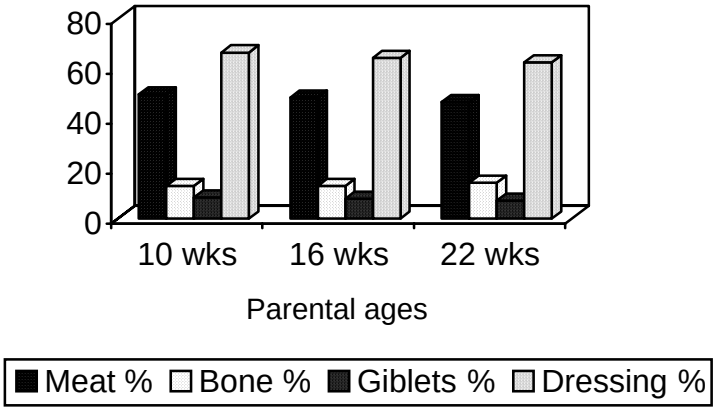


Figure 6. The effect of parental ages on some carcass traits in females of Japanese Quail .



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الملخص العربي

تأثير بعض العوامل غير الوراثية على بعض صفات الذبيحة فى السمان اليابانى

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أجريت هذه الدراسة على ٥٤ طائر من السمان اليابانى أخذت عشوائيا من خلال ثلاثة من نظم التزاوج وثلاثة من النسب الجنسية وثلاثة من أعمار الآباء وتهدف الدراسة الحالية إلى دراسة تأثير هذه العوامل غير الوراثية على بعض صفات الذبيحة في السمان الياباني حيث تم دراسة صفات الذبيحة من خلال حساب النسب المئوية لكل من اللحم – العظم – الأجزاء المأكولة – التصافي في ذبائح ذكور وإناث السمان الياباني٠ وقد أوضحت الدراسة النتائج الآتية :

تأثير نظم التزاوج:

ازدادت النسبة المئوية للتصافى معنويا من (٦٠,٠١و ٦٢,٨٦%) بالنسبة للذكور و(٦١,٢٠و ٦٣,٥٦%) بالنسبة للإناث في الذبائح الناتجة من تزاوج الاخوة الأشقة وأنصاف الأشقة إلى (٦٥,١١و ٦٦,١٦%) بالنسبة للذكور والإناث الناتجة من التزاوج العشوائي. ولوحظ نفس الإتجاه للنسبة المئوية للحم والأجزاء المأكولة. بينما لوحظ عكس الإتجاه بالنسبة للنسبة المئوية للعظم.

تأثير النسب الجنسية:

ازدادت النسبة المئوية للتصافى معنويا من (٦٣,١١و٥٩,٠٢ %) بالنسبة للذكور و (٦٢,١٦و٦٠,٣٩ %) بالنسبة للإناث فى الذبائح الناتجة من تزاوج النسب الجنسية ١: ٢ و١: ٣ إلى (٦٣,٧١ و ٦٤,٩١ %) فى الذبائح الناتجة من تزاوج النسبة الجنسية ١:١. ولوحظ نفس الإتجاه للنسبة المئوية للحم والأجزاء المأكولة. بينما لوحظ عكس الإتجاه بالنسبة للنسبة المئوية

للعظم.

تأثير عمر الآباء:

ازدادت النسبة المئوية للتصافى معنويا من (٦٣,٨٨ و ٦٢,٠١% بالنسبة للذكور و ٦٤,١١ و ٦٢,٣٤% بالنسبة للإناث) للذبائح الناتجة من آباء عمرها (١٦ و ٢٢ أسبوع) إلى ٦٦,١٨ و ٦٦,٤١% بالنسبة لذكور وإناث الذبائح الناتجة من آباء عمرها ١٠ أسابيع. ولوحظ نفس الإتجاه للنسبة المئوية للحم والأجزاء المأكولة. بينما لوحظ عكس الإتجاه بالنسبة للنسبة المئوية للعظم.