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Comparison of Egg Weight Between Two Quail Strains

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Abstract: In order to investigate egg weight of two quail strains 2550 eggs of Japanese quail (*Coturnix japanese*) and 1975 eggs of Range quail (*Coturnix ypisilophorus*) were weighted individually at three age groups (first group: 60-145, second group: 145-230, and last group: 300-385 days of age). Body weights of two strains were not significantly different (p>0.05). Body weights at 60 days age were significantly different (p<0.01), but there were not any significant difference between the ages of 145 and 300 days (p>0.05). Egg weight of Japanese quails and Range quails were 11.23±0.03 and 11.17±0.05 respectively which were not significantly different (p>0.05). Effects of the interaction of strain, age and sex for egg weight and body weight were significantly different (p<0.01). Minimum and maximum egg weight for Japanese quail were 7.08 and 13.84gr respectively, however these records were 7.01 and 13.84gr for Range quail. Individual variation of in two strains for eggs weight were significantly different (p<0.01).

Key words: *Coturnix japanese*, *Coturnix ypisilophorus*, Quail, egg weight

Introduction

The Japanese quail is bred for egg and meat production (Minvielle, 1998; Baumgartner, 1994), but while reports on quail growth and body composition are numerous (e.g.: Marcks, 1993; Minvielle *et al.*, 2000; Oguz and Minvielle, 2001; Vali *et al.*, 2005a), only few studies have been published on egg production (Nestor *et al.*, 1983; Bacon *et al.*, 1986; Minvielle *et al.*, 1997; Minvielle and Oguz, 2002) or on both types of traits (Strong *et al.*, 1978; Minvielle *et al.*, 1999). Moreover, reliable values of strain in quail are even less common. In the present work, egg weight production was measured in two quail strains: Japanese quail (*Coturnix japanese*) and Range quail (*Coturnix ypisilophorus*).

Materials and Methods

Thirty five pairs of Japanese quails (*Coturnix japanese*) and thirty one pairs of Range quails (*Coturnix ypisilophorus*) in three age groups of 60, 140, and 300 days of age were randomly selected from the parent populations (the parent population were included 500 *Coturnix japanese* and 500 *Coturnix ypisilophorus*). One male and one female quail were kept in an individual one-tier cage (50×50×70cm). All the birds were wing banded according to the cage number. The temperature in house was around 20°C and the light was given 15 hr per day (from 6:00 AM until 9:00 PM). Diet contained 20% crude protein and 2650 kcal/kg metabolizable energy. Food and water were available *ad libitum* (waterier and feeder were from trough type). The eggs were collected for 85 days. Every afternoon the collected eggs were marked according to cage number and then weighed individually. Quails were weighed at starting point of the

experiment. 4525 eggs from two strains were recorded for weight at three age groups with a digital balance with accuracy 0.01 gr. Variance components of egg weights and body weights traits were estimated using the General Linear Models (GLM) procedures of SAS software (1998). The following model was used for analysis of data:

$$Y_{ijklmn} = \mu + ST_i + AG_j + (SA \times AG \times SE)_{klm} + e_{ijklmn}$$

where: Y_{ijklm} was an individual observation for trait Y. μ was overall mean for trait Y_{ijklm}. ST_i was fixed effect of the ith strain. AG_j was fixed effect of the jth age. $(SA \times AG \times SE)_{klm}$ was fixed effects of the interaction of the kth strain with the lth age with m^{th} sex. e_{ijklmn} was random error associated with the measurement of each individual.

Results and Discussion

Description and statistical parameters of egg weight for both strains are shown in Table 1. Least-squares means and standard errors of strain and strain× age×sex for body weight and egg weight are shown in Table 2.

Body weights of two strains were not significantly different (p>0.05). Body weights at 60 days of age were significantly different (p<0.01), but there were not any significant difference between the age groups of 145 and 300 days (p>0.05). Vali *et al.* (2005a) reported body weight of two strains Japanese and Range quails at 63 days of age 198.46±2.17 and 192.81±2.93, respectively that did not show significant difference (p>0.05). Sex was a significant source of variation for body weight at several ages (p<0.01). Female quails showed a higher

Table 1: Description of data for egg weight in two quail strains, (Co) *Coturnix japanese*,(Ra) *Coturnix ypisilophorus* or Range quail for a period of 85 days

strain	Age (days)	No.Obs.	Sum (gr)	Min (gr)	Max (gr)	Mean (gr)	SE	SD	CV
Co	60-145	803	8929.36	8.20	13.56	11.12	0.04	0.86	7.73
	145-230	851	9990.74	8.74	13.93	11.74	0.09	1.11	9.49
	300-385	896	9721.60	7.08	13.61	10.85	0.03	1.10	10.12
Ra	60-145	730	8504.50	8.08	13.57	11.65	0.03	0.80	6.87
	145-230	641	7390.73	8.03	13.21	11.53	0.21	1.33	11.51
	300-385	604	6245.36	7.01	13.84	10.34	0.03	1.06	10.28

No. Obs: number of observations, Min: minimum, Max: maximum, SD: standard deviation, SE: standard error, Sum: total of egg weight and CV: coefficient of variation.

Table 2: Least squares mean and standard error for body weight and egg weight(gr) in two quail strains

Source of variance				BW (gr)	EW (gr)
Overall mean				216.77±2.07	10.85±0.02
Strain (both of sex)		Co		200.54±1.39[a]	11.23±0.03[a]
		Ra		202.30±2.34[a]	11.17±0.05[a]
Age (both of sex)		60-145 day		193.56±2.72[b]	11.38±0.03[b]
		145-230 day		203.74±2.25[a]	11.63±0.09[a]
		300-385 day		206.96±2.05[a]	10.59±0.01
Strain×age×sex	Co	60-148 day	F	204.28±3.82[de]	11.11±0.04[b]
			M	179.48±2.67[g]	-
		145-230 day	F	214.23±3.07[c]	11.73±0.08[a]
			M	188.78±3.54[ef]	-
		300-385 day	F	227.24±3.99[a]	10.84±0.02[c]
			M	189.26±3.21[e]	-
	Ra	60-148 day	F	207.51±8.36[bcde]	11.64±0.04[a]
			M	173.02±5.64[g]	-
		145-230 day	F	221.92±5.00[ac]	11.53±0.16[a]
			M	185.90±4.53[fg]	-
		300-385 day	F	225.45±4.53[ab]	10.33±0.02[d]
			M	200.01±5.40[e]	-

BW: body weight, EW: egg weight, Co: *Coturnix japanese*, Ra: *Coturnix ypisilophorus* or Range quails, F: female, M: male
Letters [a, b, c, d, e, f, g] Means within each subclass column with different superscript are significantly different (P<0.01)
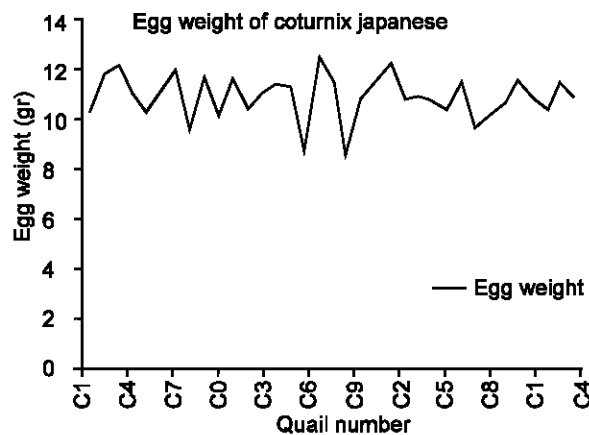

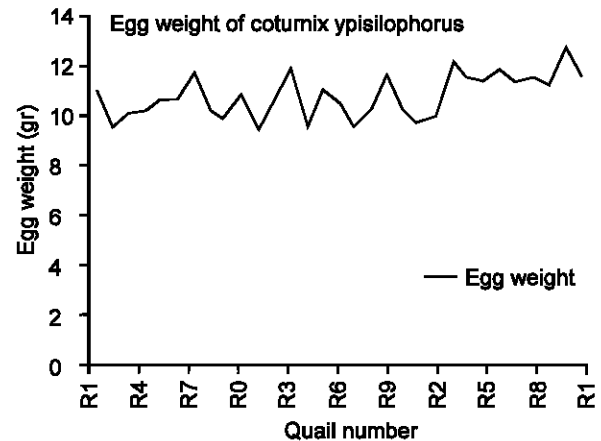Fig. 1: Mean egg weight of *Coturnix japanese* from number 1 to 35

Fig. 2: Mean egg weight of *Coturnix ypisilophorus* from number 1 to 31

body weight than that of male quails, which was agreed with the results previous studies (Baumgartner, 1994; Minvielle *et al*., 2000; Vali *et al*., 2005a; Minvielle *et al*., 1999). Data from this study clearly indicated that effects of interaction of strain, age and sex were significantly different (p<0.01).

Egg weight of two strains did not show any significant difference (p>0.05), which was in agreement with the report of Vali *et al*. (2005b), but results of the present experiment showed that egg weight of both strains were heavier which may be due to different raring conditions. It is also interested that these egg weights were higher when compared with that of random bred control for *Coturnix japanese* in previous studies (Nestor *et al*.,

1983; Bacon *et al.*, 1986; Vali *et al.*, 2005a,b). The age effect was significantly different for egg weight (p<0.01), also as is shown in Table 2 the effects of interaction of strain, age and sex were significantly different (p<0.01). Individual variation of quails in two strains for eggs weight was also significantly different; with the minimum and the maximum egg weight for Japanese quails were 7.08 and 13.93gr respectively. However these records were 7.01 and 13.84gr for Range quails (Fig. 1 and 2).

Acknowledgment

References

Bacon, W.L., K.E. Nestor and D.W. Long, 1986. Divergent selection for body weight and yolk precursor in *Coturnix coturnix Japanica*. 6. Correlated response in plasma calcium and eggshell traits. Poult. Sci., 65: 355-359.

Baumgartner, J., 1994. Japanese quail production, breeding and genetics. World's Poult. Sci. J. 50: 227-235.

Marks, H.L., 1993. Carcass composition, feed intake, and feed efficiency following long-term selection four week body weight in Japanese quail. Poult. Sci., 72: 1005-1011.

Minvielle, F., J.L. Monvoisin, J. Costa and A. Frenot, 1997. Quail lines selected on egg number either on pure line or on crossbred performance. 12th international symposium, Pruhonice near Prague (Czech Republic) September 1-3.

Minvielle, F., 1998. Genetic and breeding of Japanese quail for production around the world. Proceedings 6th Asian Pacific poultry congress Nagoya, Japan June 4-7th.

Minvielle, F., E. Hirigoyen and M. Boulay, 1999. Associated effects of the Roux plumage color mutation on growth, carcass traits, egg production and reproduction of Japanese quail. Poult. Sci., 78: 1479-1484.

Minvielle, F., G. Gandemer, Y. Maeda,G. Leborgoyen and M. Boulay, 2000. Carcass characteristics of a heavy Japanese quail line under introgressios with the roux gene. Br. Poult. Sci., 41: 41-45.

Minvielle, F. and Y. Oguz, 2002. Effects of genetics and breeding on egg quality of Japanese quail. World's Poult. Sci. J., 58: 291-295.

Nestor, K.E., W.L. Bacon and A.L. Lambio, 1983. Divergent selection for egg production in *Coturnix coturnix Japonica*. Poult. Sci., 62: 1548-1552.

Oguz, I. and F. Minvielle, 2001. Effects of genetics and breeding on carcass and meat quality of Japanese quail: A review. Proceedings of XV European symposium on the quality of poultry meat, WPSA Turkish branch, 9-12 September Kusadasi-Turkey.

SAS Institute, 1998 Statistical Analysis System. SAS Institute Inc. Cary, NC.

Strong, Jr. C.F., K.E. Nestor and W.L. Bacon, 1978. Inheritance of egg production, egg weight, body weight and certain plasma constituents in Coturnix. Poult. Sci., 57: 1-9.

Vali, N., M.A. Edriss and H.R. Rahmani, 2005a.Gentic parameters of body and some carcass trait in two quail strains. Int. J. Poult. Sci., 4: 296-300.

Vali, N., M.A. Edriss and H.R. Rahmani, 2005b.Comparison between hatching of two quail strains. Pak. J. Biol. Sci., 8: 1062-1063.