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Short Communication

Comparative Analysis of Early Growth Performance of Two Meat Quail Populations

Jun Yan Bai*, Xiao Hong Wu, Shuai Yang, You Zhi Pang, Heng Cao, Hong Deng Fan, Xue Yan Fu, Kun Peng Shi and Xiao Ning Lu

Henan University of Science and Technology, Luoyang Shi, Henan Sheng, China

ABSTRACT

The purpose of this study was to investigate the early growth performance of French giant quails and Savimito quails.In this study, body weight, tibia length, chest depth, chest width, sternum length, body length and tibia circumference of 3-5 weeks old meat quails were measured.The results showed that the at 3-5 weeks of age, the body weight, chest depth, body length, shank length, and sternum length of the French giant female quail were significantly higher than those of the Savimite female quail (P<0.05), while only the body weight of the French giant male quail was significantly higher than that of the Savimite male quail (P<0.05). At 5 weeks old, the shank circumference of the French giant female quail was significantly lower than that of the the Savimite female quail (P<0.05).The regression equation of body weight to body size of Savimai quail was $Y=-64.849+16.153X_1+27.5X_2+11.6\ X_3$, with a fitting degree of 0.865. The regression equation of body weight to body size of French giant quail was $Y= -148.103+11.851X_1+20.927X_2+59.278X_4$, with a fitting degree of 0.883. X_1, X_2, X_3 and X_4 in both regression equations represented body length, sternum length, chest depth and tibia circumference, respectively.

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Authors' Contributions
JYB conceived and designed the study, collected samples and wrote the article. XHW, SY and YZP helped in sampling. HDF, XYF and HC helped in analysis of data. KPS and XNL helped in writing of article.

Key words
French giant quail, Savimite quail, Body weight, Body size.

French giant quail is a kind of excellent meat quail with huge body in the world. It has strong adaptability, fast growth and strong resistance to stress. The sexual maturity of Savimai carnivorous quail is relatively early. The female quail can produce at the earliest age of 35 days, usually about 40 days. At present, quail breeding is increasing in poultry. It can be used as an experimental animal (Bai *et al*., 2016a, b, c, d, 2017). This study mainly analyzed the differences of body weight and body size traits between French giant quail and Savimet quail at different weeks of age, and constructed the regression equation of body weight to body size in different quail breeds, which can provide reference for the breeding of meat Quail in the future.

Materials and methods

French giant (n = 49) quails and Savimito quails (n = 36) at two weeks old were fed at 8 am and 5 p.m. with free drinking water and 24 h light.

Six body size traits, including tibia length, chest depth, chest width, sternum length, body oblique length and tibia circumference, were measured on the 3rd and 5th week of age (12 h after stopping food).

The growth performance of two quail breeds was compared and analyzed by SPSS software, and Duncan's multiple tests were carried out. The results were expressed in the form of average+standard error, and the regression equation of quail body weight to body size traits was established by stepwise regression method.

Results and discussion

Table I shows comparison of body weight and body size of 3 weeks and 5 weeks old French giant quails and Savimite quails. At 3-5 weeks of age, the body weight, chest depth, body length, shank length, and sternum length of the French giant female quail were significantly higher than those of the Savimite female quail (P<0.05), while only the body weight of the French giant male quail was significantly higher than that of the Savimite male quail (P<0.05). At 5 weeks old, the shank circumference of the French giant female quail was significantly lower than that of the the Savimite female quail (P<0.05). Wei *et al.* (2011) showed that the body weight of Wuxi strain of French giant meat quail reached 102.15-141.25g at the third week of age, which was higher than that of French giant female quail and French giant male quail in this study (93.194-97.33g). Jatoi *et al.* (2015) showed that the body weight of three Japanese quail strains (Major, Kaleem, Saadat) at the 3rd week of age was slightly higher than that of the French giant quail and Savimite Quail in this study, which may be due to differences in quail breeds, feed nutrition, and feeding management. Taskin *et al*. (2017) showed that body weight was a very important factor in selection studies and it also increased the efficiency of the selection program with other selection features.

* Corresponding author: junyanbai@163.com
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Table II shows the correlation coefficient between body weight and tibial length and tibial circumference of Savimite quail is not significant (P>0.05). There is a significant correlation between the tibial circumference and chest width of Savimite quail (P<0.05). In addition, there is a very significant positive correlation between other body weight and body size traits of Savimite quail (P<0.01). The breast width and breast bone length have the largest correlation coefficient of 0.791. There was a significant positive correlation between body weight and tibia length, chest width, chest depth, sternum length, body oblique length and tibia circumference in French giant quail (P<0.01). There was also a significant positive correlation between any two of the other body size traits (P<0.01). Body weight and chest depth had the maximum correlation coefficient of 0.765, followed it was the correlation coefficient between chest depth and chest width (0.715). Jiao *et al*. (2001) showed that the body weight of Japanese quail was moderately correlated with body length, chest width and chest depth, but weakly correlated with tibia length and sternum length. The correlations between sternum width and sternum length, between sternum length and body length of Japanese quail were weaker (r=0.2322 and 0.2055, respectively), which was not accord with the results in this study that there was a significant positive correlation between body weight and tibia length, chest width, chest depth, sternum length, body oblique length and tibia circumference in French giant quail (P<0.01).

Table I.- Comparison of body weight and size traits of meat quails.

Week age	Traits	Female quail		Male quail	
		French giant quail	Savimito quail	French giant quail	Savimito quail
3 weeks old	Body weight (g)	97.33±2.25^{a}	79.93±4.41^{b}	93.19±2.45^{a}	78.78±4.17^{b}
	Shank length (cm)	3.58±0.03^{a}	3.41±0.07^{b}	3.60±0.03^{a}	3.48±0.05^{a}
	Chest width (cm)	2.78±0.04^{a}	2.56±0.07^{a}	2.65±0.04^{a}	2.58±0.05^{a}
	Chest depth (cm)	3.22±0.04^{a}	2.91±0.09^{b}	3.14±0.04^{a}	3.14±0.07^{a}
	Breastbone length (cm)	3.24±0.06^{a}	3.04±0.13^{b}	3.20±0.05^{a}	3.11±0.09^{a}
	Body length (cm)	7.57±0.08^{a}	6.99±0.22^{b}	7.24±0.11^{a}	7.13±0.12^{a}
	Shank circumference (cm)	1.50±0.01^{a}	1.40±0.02^{a}	1.50±0.01^{a}	1.44±0.01^{a}
5 weeks old	Body weight (g)	157.99±2.99^{a}	143.12±7.62^{b}	153.90±3.36^{a}	148.55±4.92^{b}
	Shank length (cm)	3.90±0.06^{a}	3.82±0.02^{b}	3.80±0.02^{a}	3.84±0.03^{a}
	Chest width (cm)	3.24±0.03^{a}	3.19±0.07^{a}	3.25±0.02^{a}	3.19±0.05^{a}
	Chest depth (cm)	3.41±0.03^{a}	3.22±0.06^{b}	3.43±0.03^{a}	3.37±0.03^{a}
	Breastbone length (cm)	4.29±0.05^{a}	4.09±0.11^{b}	4.34±0.06^{a}	4.28±0.08^{a}
	Body length (cm)	9.44±0.10^{a}	9.06±0.25^{b}	9.39±0.09^{a}	9.25±0.17^{a}
	Shank circumference (cm)	1.66±0.02^{b}	1.88±0.19^{a}	1.69±0.01^{a}	1.71±0.03^{a}

If the letters are not the same, the difference is significant(P<0.05), but if the letters are the same, the difference is not significant(P>0.05).

Table II.- Correlation analysis between body weight and size traits of meat quails.

Population	Traits	Weight	Shank length	Chest width	Chest depth	Breastbone length	Body length	Shank circumference
Savimito quail	Body weight	1						
	Shank length	0.268	1					
	Chest width	0.461**	0.541**	1				
	Chest depth	0.339*	0.629**	0.696**	1			
	Breastbone length	0.576**	0.587**	0.791**	0.708**	1		
	Body length	0.495**	0.625**	0.718**	0.742**	0.780**	1	
	Shank circumference	0.259	0.606**	0.411*	0.637**	0.576**	0.472**	1
Female quail	Body weight	1						
	Shank length	0.703**	1					
	Chest width	0.654**	0.472**	1				
	Chest depth	0.765**	0.572**	0.715**	1			
	Breastbone length	0.687**	0.510**	0.662**	0.612**	1		
	Body length	0.668**	0.540**	0.661**	0.521**	0.567**	1	
	Shank circumference	0.619**	0.571**	0.448**	0.627**	0.435**	0.378**	1

Table III.- Regression analysis of body weight to body size traits of meat quail.

Population	Independent variable	Regression coefficient	T value	P value	R^2 (fitting degree)
Savimito quail	Constant	-64.849	-3.416	0.001	0.865
	Body length (X_1)	16.153	4.819	0.000	
	Breastbone length (X_2)	27.315	4.256	0.000	
	Chest depth (X_3)	-22.436	-3.058	0.003	
	Tibial circumference (X_4)	11.371	2.356	0.021	
Female quail	Constant	-148.103	-9.139	0.000	0.883
	Body length (X_1)	11.851	3.801	0.000	
	Breastbone length (X_2)	20.927	3.614	0.001	
	Tibial circumference (X_4)	59.278	4.240	0.000	

Table III shows regression analysis of body weight to body size traits of meat quails. It can be seen that the regression equation of body weight to body size of Savimite meat quail is: $Y=-64.849+16.153X_1+27.315X_2-22.436X_3+11.371X_4$, and the fitting degree of which is 0.865. The regression equation of body weight to body size of French giant meat quail is: $Y=-148.103+11.851X_1+20.927X_2+59.278X_4$, and the fitting degree of which is 0.883. X_1, X_2, X_3 and X_4 in both regression equations represented body length, sternum length, chest depth and tibia circumference, respectively. In production, the above regression equations can be used to predict the body weight of quail through its body size traits. Pang *et al*. (2008) showed that the regression equation of body weight to body size traits of Korean male quail was: $Y=-90.395+19.690X_2+20.667X_4+8.899X_5$, and X_2, X_4 and X_5 in the regression equation represented chest width, sternum length and body length, which are similar to the results in this study.

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Statement of conflict of interest

The authors declare no conflict of interest.

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