

The Effect of Egg Weight on Hatching Rate and Fattening Performance of Partridges (*A. chukar*)

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Abstract: This study was conducted to Figure out the effect of egg weight on hatching rate and fattening performance of partridges (*A.Chukar*) reared under intensive conditions. The eggs were divided into two groups as big (≥ 20 g) and small (< 20 g), then incubated. Hatching rate for big and small groups were 75,8 and 74.1 %, respectively. Hatching weight for big and small groups were 14,3 \pm 0,16 and 13,2 \pm 0,16 g, respectively. All the chicks were fattened till 16 weeks of age. At the end of fattening period, average live weight of male and female partridges were 509 \pm 9 and 495 \pm 12 g for big and 425 \pm 14 and 421 \pm 9 g for small groups, respectively. Males had higher live weight than females ($p<0.001$). Egg weight affected live weight of the partridges at 2-4, 8-10 and 12-14 weeks of age ($p<0.05$). There were no significant differences between the groups in terms of feed consumption through fattening period. Total feed consuming for big and small groups were 2200.7 \pm 125.3 and 2059,4 \pm 36,08 g, respectively. Differences between feed conversion ratios of the groups were not significant through fattening period. FCR was calculated as 4,83 \pm 0,27 and 4,87 \pm 0,12 for big and small groups, respectively. As a result, it could be said that egg weight is not a significant factor on hatching rate and fattening performance of the partridges.

Key words: Partridges, egg weight, hatching rate, fattening performance

INTRODUCTION

Egg weight of the poultry for hatching is one of the main affecting factors on hatching rate, hatching weight, growth and fattening performance. It was reported in many publications that relationships between egg weight and hatching weight is important and the bigger egg, the heavier chicks obtained at hatching^[1-6].

Al-Murrani^[7] reported that the heavier hatching weight, the heavier live and carcass weight obtained at the end of fattening. On the other hand, some researchers indicated that chicks hatched from bigger egg had heavier hatching weight than chicks hatched from smaller egg, however, no significant differences were obtained in terms of live and carcass weight at the end of fattening period^[4,6]. Besides, significant correlations between egg weight and hatching weight; however, these correlations were no longer at the end of fattening period of quails^[6]. Şengül and Çetin^[8] noticed that hatching weight affected live weight and feed consumption of turkeys at the end of fattening but did not FCR and carcass yield.

Different results were obtained for hatching rate of partridges in some studies. Hatching rate of partridges were calculated as 85.3 by Yannakopoulos^[9] and 90-95 %

by Çetin and İnkırkçı^[10] Özek^[11] indicated that hatching rate of partridges are affected by storing condition and length; by storing eggs for 1-7 and 8-14 days, 78.4 and 77.1 % hatching rates were observed, respectively. Hatching rate was calculated as 80.97 and 66.5 % for first and second year of age of partridges, respectively^[12]. Mating rates could be the other factor for hatching rate. Hatching rates were calculated as 69.7, 65.5 and 66.5 % when male-female partridge rates 1: 3, 1: 4 and 1: 5, respectively^[13]. Two different protein rates in diet of partridges had different (80.9 and 82.5 %) hatching rates^[14]. Different lightening period also affects hatching rate and egg weight of partridges; hatching rates and egg weights for two different lightening regimens was found as 97.1-92.8 % and 20.4- 21.2 g, respectively^[14].

Hatching rates of partridges kept in cage as flock were calculated as 91.1-93.7 % for the eggs weighted between 19.3 and 18.9 g. For same flock, average hatching weight was 13.7 g and average live weight at 8, 12 and 16 weeks of age were 161.3, 272,4 and 382.9 g, respectively^[15]. On the other side, hatching weight, live weight, feed consuming and FCR of partridges at 12 weeks of age were 13.1, 425.5, 1582.3 g and 3.84, respectively^[16]. Total feed consuming and average live weight at 16 weeks of age

Table 1: Live weight and live weight gain (g) of partridges at different period

Groups							
Week	Big		Small		Variation sources		
	Male	Female	Male	Female	Egg Weight. [A]	Sx [B]	[A]*[B]
Live weight (g)							
1	29±1 ^b	24±2 ^a	26±1 ^{ab}	25±1 ^{ab}	NS	*	NS
2	50±2 ^a	42±3 ^a	45±2 ^a	46±2 ^a	NS	NS	NS
4	149±4 ^b	123±6 ^a	129±5 ^a	126±4 ^a	NS	**	NS
6	196±5 ^b	162±8 ^a	173±7 ^a	158±5 ^a	*	**	NS
8	293±6 ^c	251±8 ^a	273±7 ^b	258±6 ^{ab}	NS	***	NS
10	384±7 ^c	321±11 ^a	349±9 ^b	324±7 ^{ab}	NS	***	NS
12	429±9 ^c	367±13 ^{ab}	395±11 ^b	363±8 ^a	NS	***	NS
14	474±9 ^c	401±14 ^a	460±12 ^b	402±9 ^a	NS	***	NS
16	509±9 ^c	425±14 ^a	495±12 ^b	421±9 ^a	NS	***	NS
Live weight gain (g)							
1-2	21.6±1.1	18.0±1.6	19.4±1.4	20.5±1.1	NS	NS	NS
2-4	98.3±2.9 ^b	80.8±4.4 ^a	84.0±3.7 ^a	80.6±2.8 ^a	*	**	NS
4-6	47.4±2.9 ^b	39.2±4.4 ^{ab}	43.3±3.7 ^b	31.4±2.8 ^a	NS	**	NS
6-8	97.5±3.5	89.2±5.2	100.4±4.4	100.0±3.4	NS	NS	NS
8-10	90.1±3.2 ^b	69.8±4.7 ^a	75.8±4.0 ^a	66.0±3.1 ^a	*	***	NS
10-12	45.2±5.3	46.6±7.8	46.1±6.6	39.2±5.1	NS	NS	NS
12-14	44.9±4.4 ^a	33.4±6.6 ^a	65.1±5.5 ^b	38.9±4.2 ^a	*	**	NS
14-16	35.5±3.5 ^b	23.8±5.2 ^{ab}	35.1±4.4 ^b	19.6±3.3 ^a	NS	**	NS

^{abc}Means within line having different letter are significantly different. *p<0.05, **p<0.01, ***p<0.001, NS: Non significant

partridges were indicated as 3135 and 568 g, respectively^[17]. Özek and Bahtiyarca^[18] obtained 20.2 g average egg weight of partridges.

In this study, the effects two different hatching egg weights on hatching rate and fattening performance and live weight, total feed consuming and FCR of partridges at the end of 16 weeks of age were investigated.

MATERIALS AND METHODS

Total 145 eggs were collected from the partridge flocks of Harran University, Poultry Facilities. All the partridges, eggs collected from them, were a year of age. Eggs were collected twice a day for 14 days and stored at 10-14°C in storage.

Eggs were divided into 2 groups as big (≥ 20 g; n =62) and small (< 20 g; n = 83), then incubated. All the day old chicks were wing tagged and placed in brooder for 14 days. They were placed in floor pens with wood shave litter from 15 days of age till end of trial. Total 90 chicks were divided into two groups and each group had 3 replicates (n = 15 in each pens). Size of the pens was 2x2.5x2.5 m. They were supplied with *Ad libitum* access to water and feed until the end of the experiment. Chicks were exposed to 24-h and 14-h lighting regiment for first 3 weeks and after that, respectively. The experiment was lasted 16 weeks and conducted in natural ventilated and windowed house from beginning of June to end of September. Animals were fed by feed containing 28 % CP and 2700 kcal kg⁻¹ ME for first 4 weeks, 24 % CP and 2750 kcal kg⁻¹ ME for 4-8 weeks, 22 % CP and 2800 kcal kg⁻¹

ME for 8-12 weeks, 20 % CP and 2850 kcal kg⁻¹ ME for 12-16 weeks of age. Feed consuming and weighing animals were done by weekly.

The data were analyzed by SPSS 9.0 pocket program. Comparisons between means of the two groups were analyzed by t-test. Duncan's New Multiple-Range Tests were used to compare means of variables.

RESULTS

Hatching rates and weight were found as 75.8 % and 14.3±0.16 g for big group, 74.1 % and 13.2±0.16 g for the small group. Average live weight (g) and weight gain (g) of the partridges in different period were reported in Table 1.

Average live weights of male and female were 509±9 and 495±12 g for big group, 425±14 and 421±9 g for small group at the end of experiment. Males were found heavier

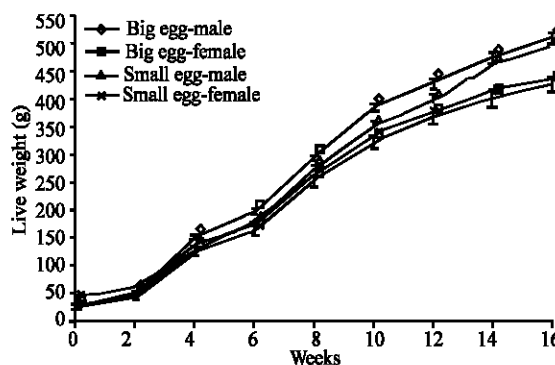


Fig. 1: Weekly live weight of partridges

Table 2: Weekly and cumulative feed consumption (g) and FCR of the partridges

Groups	Feed consumption (g)		FCR	
	Big	Small	Big	Small
1-2	27.1±1.4	26.0±1.3	1.33±0.07	1.33±0.12
2-4	132.1±10.9	137.1±8.0	1.43±0.13	1.67±0.09
4-6	229.4±12.3	209.7±15.1	5.30±0.85	5.90±0.51
6-8	255.1±24.6	229.2±5.0	2.70±0.23	2.83±0.55
8-10	456.4±38.4	366.5±14.0	5.47±0.57	5.30±0.26
10-12	528.8±40.5b*	347.1±48.4a	12.00±1.82	9.17±2.61
12-14	436.6±27.0	392.1±7.5	10.80±1.25	8.73±1.67
14-16	374.2±9.3	351.7±9.9	12.23±2.20	13.93±0.58
R	0.957***		0.948***	
	Cumulative feed consumption (g)		Cumulative FCR	
1-2	27.1±1.4	26.0±1.3	1.33±0.07	1.33±0.12
1-4	154.0±15.9	163.1±7.1	1.37±0.12	1.57±0.03
1-6	375.8±38.3	372.8±15.7	2.37±0.30	2.73±0.09
1-8	612.2±59.1	601.9±16.3	2.43±0.22	2.53±0.09
1-10	1015.5±86.2	968.5±16.9	3.00±0.25	3.13±0.09
1-12	1482.1±106.8	1315.6±35.8	3.87±0.30	3.77±0.15
1-14	1867.2±112.2	1707.7±30.3	4.43±0.23	4.27±0.12
1-16	2200.7±125.3	2059.4±35.8	4.83±0.32	4.87±0.12
R	0.999***		0.996***	

abc Means within line having different letter are significantly different. *p<0.05, **p<0.01, ***p<0.001, r: Correlation coefficient between groups

than females (p<0.001). Growth curve of partridges was shown in Fig.1.

Sex had significant effect on the live weight through experiment but at week 2nd. However, egg weight had an effect on live weight at week 6th only (p<0.05).

Egg weight by sex interaction was not significant for all weeks of the experiment in terms of live weights. Weekly live weight gain was affected by sex except 1-2, 6-8 and 10-12 weeks of experiment (p<0.01, p<0.001). Egg weight affected 2-4, 8-10 and 12-14th weeks of live weight gain significantly (p<0.05). Egg weight by sex interaction was not significant for all weeks of the experiment in terms of live weight gains. Weekly and total feed consumption (g) of the partridges hatched from different weights of eggs were shown in Table 2.

In all weeks of experiment, there were no significant differences between big and small group's feed consumption except 10-12 weeks. Big group consumed feed significantly higher than small group at 10-12 weeks of experiment (p<0.05). Feed consumption tended to decrease at beginning of 10-12 and 12-14 weeks of the experiment for big and small group, respectively. Cumulative feed consumption was observed as 2200.7±125.3 g for big group and 2059.4±35.8 g for small group through 1-16 weeks of experiment. Cumulative feed consumption of the groups was not significantly different.

Differences of Cumulative FCR of the groups were not significant through experiment. Cumulative FCR of the partridges hatched from different weights of eggs were 4.83±0.27 and 4.87±0.12 for the big and small group,

respectively. Significant correlation (r = 0.948 and 0.996) was observed between weekly and cumulative FCR.

At the end of experiment, viability of the big and small groups was 85.7 and 90.5 %, respectively. Mortality was observed only in the first 3 weeks of experiment for both groups.

DISCUSSION

Egg weight did not affect hatching rate and growth performance of partridges significantly in this study. There were no significant differences between small and big group in terms of hatching rate. Observed hatching rate was found lower than finding of Yannakopoulos^[9,15,19,10,12,14] higher than Çetin^[13] and similar to Özek^[12]. Hatching weight was similar to results of Çetin *et al.*^[15] and higher than Çetin^[13].

It could be seen that live weight of partridges in small and big group was similar when 16 weeks of fattening period was evaluated. Çetin *et al.*^[15] and Özek^[11] reported 382.9 and 568 g live weights of partridges at the end of 16 weeks of fattening period, respectively. Egg weight had significantly effect on live weight at 6th week of age only. However, sex affected weekly live weight significantly in all weeks of age but in week 2. As in chicken and turkey, live weight of males was higher than females'. Egg weight sex interaction was not significant for all fattening period.

Live weight gain of the partridges hatched from different egg weights was observed differently through

fattening period. Egg weight affected live weight gain significantly ($p<0.05$) at 2-4, 8-10 and 12-14 weeks of age. On the other hand, sex had effects on live weight gain significantly ($p<0.01$, $p<0.001$) at 1-2, 6-8 and 10-12 weeks of age. So males had higher live weight gain than females. According to these findings, it could be said that males were grown faster than females. The effects of Egg weights*sex were not significant on live weight gain of the partridges through fattening period.

Generally, cumulative and periodical feed consumption of the groups were found similar and not significant. The highest feed consumption was observed at 10-12 and 12-14 weeks of age for big and small groups, respectively. After these ages, feed consumption was tended to decrease. Feed consumption differences of the groups was significant ($p<0.05$) only at 10-12 weeks of age. Even though big group consumed more feed than small group, differences were not significant. Total feed consuming observed in this study through experiment was less than observing of Özek^[11]. Same as in feed consuming, there were no significant differences between small and big groups for FCR. Big group's FCR was agreed to finding of Özek^[11], however, small group had higher FCR value than Özek's^[11]. Significant correlations were observed for both weekly and totally feed consuming and FCR of the small and big groups (Table 2). Viabilities were found as 85.7 ve 90.5 % for big and small groups, respectively and differences were not significant

As a results, It could be said that less or equal to 20 g of eggs are suitable to use for hatchery because egg weights did not affect growth performance, hatching rate and weight of the partridges negatively,

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