J. BIOL. ENVIRON. SCI.,
2007, 1(3), 117-120

The Relationship Between Growth Traits and Egg Weight in Pheasants (*P. colchicus*)

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ABSTRACT

The research was conducted to determine relationship between growth traits and egg weight in Pheasants (*Phasianus colchicus*). Pheasant eggs were separated into 3 weight groups. The eggs were classified as light (27.8-29.7g), medium (29.8-31.7g), heavy (31.8- 33.7g) weight. Eggs were incubated at 36.5 °C and 90 % relative humidity for 21 days during at which they were rotated hourly at an angle of 45°. Thereafter; these eggs were transferred into hatching machine during the last three days. A temperature of 36.0°C and relative humidity of 95 % were provided for the eggs at hatching period. Chicks at hatching were placed in separated pens as male and female mixed for each egg weight group. The effect of egg weight on chick weight at hatching, mean live weight, weight gain, feed consumption and feed efficiency were found significant ($P<0.01$). The effect of egg weight on mortality was not significant. The chick weight at hatching in light, medium and heavy egg groups were determined as 19.5, 21.8 and 22.6 g, respectively. In the egg weight X sex groups the mean live weights were determined as 940.2, 1020.5, 1091.2 g for males and 705.6, 739. 4, 778.6 g for females, respectively at 16th wks of age. In the groups the mean feed consumption and feed efficiency were found 4200.6, 4600.8, 5080.1 g and 5.1, 5.2, 5.4 kg, respectively, at 16th wks of age mixed male and female pheasant.

Key Words: Pheasant, egg weight; chick weight at hatching; growth traits

INTRODUCTION

In general pheasant rearing is made for hunting tourism (Cetin et al 1997). Some authors reported that between the pheasant species *Phasianus colchicus* is a potential species for meat production (Marsico and Vonghaia 1992; McGowan and Garson 1995). This specie lives naturally in a large area in Asia from Anatolia to China. Body length is 90 cm and or up for male, 60 cm for female pheasants. Males are different from females with their long tail and feather colors (Anonymous 1991; Scheid 1986).

It is an obligation to define the parameters of investigated characteristics in order to obtain and protect continuity in the genetic material of the avian population. The definition of these parameters largely depends on the factors that affect the investigated characteristics. The variation for egg weight in avian is high. In general egg weight increased with increased body weight of birds however, high body weight species product small eggs (O'Connor 1984).

This study was carried out with the aim of determining the relationship between growth traits and egg weight in pheasants.

MATERIALS AND METHODS

A total of 270 eggs were collected from Pheasant at the age of 35-38 weeks and were stored at 16- 18 ºC and 65-75 % RH for 4 days. The eggs were classified as light (27.8-29.7g), medium (29.8-31.7g), heavy (31.8-33.7g) weight. Eggs were incubated at 36.5 °C and 90 % relative humidity for 21 days during at which they were rotated hourly at an angle of 45°. Thereafter; these eggs were transferred into hatching machine during the last three days. A temperature of 36.0°C and relative humidity of 95 % were provided for the eggs at hatching period. The chicks that hatched on the same day were weighed on a digital balance with 0.01 g precision. Chicks at hatching were placed in separated pens as male and female mixed for each egg weight group. Each weight group were separated into 4 groups at randomly and placed into pens with 5x5 m^2 dimensions. The each pen was consisted of 15 pheasant.

The pheasants received starter diet (26.2 %CP and ME 13.0 MJ/kg of diet) between 1-28 th days. A grower diet (20.0 %CP and ME 13.0 MJ/kg of diet) was fed between 29-85 th days. The finisher diet (14.0 %CP and ME 11.6 MJ/kg of diet) was fed between 86-114 th days (Wiseman 1987). The environmental conditions were the same for all groups. The chicks in the groups were weighed individually and weekly and increases in live weight were recorded; the weightings were done with 0.01 g precision.

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The groups were given feed in the morning, after weighing, and the feed that remained in the feeder of each group was weighed at every weekend in order to determine the weekly feed consumption at the group level. The deaths in the groups were recorded daily for determining the weekly mortality ratios.

The research was carried out using a randomized-plots experimental design. The Minitab (1991) package program was used in the evaluation of statistical analyses. Differences between the means were compared using the Duncan Test and the Chi-Square analysis was used in the determination of mortality ratios.

RESULTS AND DISCUSSION

The recorded live weight values of the groups are given in Table 1. The effects of egg weight on the chick hatch weight and live weight were found to be significant (P<0.01). The chick weight at hatching in light, medium and heavy egg groups were determined as 19.5, 21.8 and 22.6 g, respectively. In the egg weight X sex groups the mean live weights were determined as 940.2, 1020.5, 1091.2 g for males and 705.6, 739.4, 778.6 g for females, respectively at 16th wks of age.

Table 1. Mean live weights (g) of the experimental groups (mean ± SEM)

Traits		Hatched Chick Weight	2nd wks	4th wks	8th wks	12th wks	16th wks
Egg weight Groups	n	**	**	**	**	**	**
Light	60	19.5^{c} ± 0.28	46.2^{b}± 1.31	150.5^{b}± 3.12	454.5^{b}± 10.14	694.7^{b}±12.47	822.9^{c}±31.78
Medium	60	21.8^{b} ± 0.34	51.2^{a}± 1.48	157.8^{a}± 4.68	475.4^{a}± 13.28	735.6^{a}± 16.24	879.9^{b}±43.12
Heavy	60	22.6^{a} ± 0.52	52.7^{a}± 1.55	158.8^{a}± 5.02	479.9^{a}± 14.41	738.8^{a}± 18.36	934.9^{a}±51.29
Sex		-		**	**	**	**
Male	86	-		172.2± 6.20	503.4± 17.22	793.7± 21.32	1017.3±60.18
Female	94			139.2± 3.32	436.5± 10.39	652.3± 12.08	741.2± 29.44
Egg weight X Sex			NS	NS	NS	NS	NS
Light X Male	26	-	49.3± 1.51	167.2± 5.43	488.6±15.55	768.3±16.43	940.2±55.12
Light X Female	34	-	43.2± 1.21	133.8± 3.12	420.4± 10.10	621.2± 13.15	705.6± 27.18
Medium X Male	29	-	54.7± 1.57	175.2± 6.51	509.7± 18.10	806.8± 18.41	1020.5±63.32
Medium X Female	31	-	47.8± 1.43	140.4± 3.90	441.2± 11.78	664.4± 12.74	739. 4± 37.47
Heavy X Male	31	-	56.4± 1.62	174.1± 6.21	512.0± 18.32	806.1± 18.39	1091.2±61.08
Heavy X Female	29	-	49.1± 1.47	143.5± 4.21	447.8± 11.45	671.5± 14.22	778.6± 33.34

^{a,b,c} Column means within parameter with common superscripts do not differ P < 0.01.

NS: not significant

In domestic fowls there were positive correlation between egg weight and hatched chick weight (Wilson 1991) and heavy weight chicks has got high value nutrition reserve that way they show high live rate (O'Connor 1984). Chick weight accepted as egg weight percentage in all species, and this rate is 62-76% in chicks (Petersen 1984; Shanawany 1987). In the trial the ratio of chick weight percentage to egg weight was found 69.2%.

Changes should be expected in many biological features due to the aging of individuals or flocks as is true for all living organisms (Yannakapoulas et al 1991). One of the notable differences observed in the egg due to aging is the increase in egg weight (North and Bell 1991). A high level of genetic correlation exists between the live weight and egg weight of female breeders (Strong et al 1978; Marks 1983). Eggs of heavy animals are also heavy (Strong et al 1978; Marks 1983; Leeson et al 1991). Egg weight is critical on the hatchability (Altan et al 1995), chick weight (Shanawany 1987), chick mortality in the first days (Skewes et al 1988) and performance in later ages (Morris et al 1968; Al-Murrani 1978).

The live weight on weak 16 were determined to be the lowest in the light group of chicks, whereas the highest live weight was demonstrated in the heavy group. The effects of sex on the live weight was found to be significant (P<0.01). The highest live weight was demonstrated in the male pheasant.

Values related to cumulative feed consumption on 16th wks of age and feed conversion ratios are given in Table 2. The effect of egg weight on cumulative feed consumption was found to be significant (P<0.01). The highest feed consumption was found in the heavy group, and the lowest group was the light group. The effect of egg weight groups on feed conversion ratio was significant (P<0.01). The effect of chick hatch weight on the mortality ratio was found to be insignificant.

Table 2. Average cumulative feed consumption values (g) at the 16th wks of age, feed conversion and mortality ratio (%) related to experimental groups (mean ± SEM)

Egg weight Groups	Cumulative Feed Consumption for 16th wks of age	Feed Conversion (16th wks of age)	Mortality Ratio (0 – 16th wks)
	**	NS	NS
Light	4200.6^{c} ± 108.7	5.1 ± 0.29	8.33
Medium	4600.8^{b} ± 132.4	5.2 ± 0.18	5.00
Heavy	5080.1^{a} ± 153.1	5.4 ± 0.31	6.66

[a,b,c:] Values within columns with no common letter differ significantly P<0.01

NS: not significant

Sarıca and Karacay (1994) reported that differences between the live weights of male and female pheasants were found significant until the 14th week. The average live weights of male and female birds were determined as 1148.5 g and 842.0 g, respectively. The highest live weight gain was received among 7th and 12th weeks of age for male and female pheasants. Feed conversion ratio was recorded 4.66, 4.78 and 5.04 for the 12th, 13th and 14th weeks of age (Sarıca and Karacay 1994). In another study the average body weights of pheasants on 14th and 18th weeks were determined as; 835.6 and 955.1 g, respectively. The average body weights of female and male pheasants at the same weeks were found as; 701.6, 790.18 and 909.6 and 1074.9 g respectively.

Feed conversion ratio and feed consumption were calculated as 5.51 kg and 5141.8 g (Cetin et al 1997). In our study, the mean feed consumption and feed efficiency were found 4200.6, 4600.8, 5080.1 g and 5.1, 5.2, 5.4 kg, respectively, at 16th wks of age mixed male and female pheasant.

As a result, egg weight was found to be a significant factor on the performance of pheasant. Therefore, more detailed breeding studies aimed at improving the egg weight and chick hatch weight will increase the productivity in pheasant.

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