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A Comparison of Egg Quality Characteristics of Partridge and Pheasant Eggs, *P. colchicus*, *A. graeca*

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Abstract: In this study, some external and internal egg characteristics of pheasant and partridge were compared in viewpoint of egg component. The properties of quality that eggs have, were calculated. Totally, 160 partridges eggs and 200 pheasant eggs, which were obtained in different times in the same laying period were used as a research material. It was determined that the proportion of shell weight with the membrane, yolk weight and albumen weight to the egg weight were calculated as 10.44 and 10.75%, 37.55 and 33.05%, 52.01 and 56.20%, respectively. The ratio of yolk weight in partridge eggs was higher than the pheasant eggs ($p<0.00$). The albumen weight ratio of pheasant eggs was higher than the partridge eggs ($p<0.001$). The ratio of shell weight was similar both partridge and pheasant.

Key words: Partridge, pheasant, egg, albumen, quality, membrane, yolk

INTRODUCTION

It is becoming increasingly popular to raise partridge and pheasant for hunting or conservation areas and for sale to the gourmet food markets. Birds raised for meat must attain marketable weight as early as possible. Although, partridge and pheasants have been raised domestically approximatelly 20 years in Turkey, they are still wild birds compared with other domesticated poultry. Breeding of partridge and pheasant has been increasing intensively all over the world also. These birds are being breed for a material for hunting ground. But their meat is being consumed with their delicious taste by people (Gertonson *et al*., 1974). Eggs obtained from these birds are usually used for hatching. But, pheasant eggs are consumed restrict.

Egg weight of partridge is between 19.16 and 22.50 g (Woodard *et al*., 1982; Yannakopoulos, 1992; Cetin *et al*., 1997; Kirikci *et al*., 1999; Song *et al*., 2000). Pheasant egg weights are nearly 33 g (Tserweni-Gousi and Yannakopoulos, 1990; Cetin *et al*., 1997; Kirikci *et al*., 2003). It was reported that egg weight of partridge and pheasant is 20.84 and 33.99 g and also was reported that egg weight of pheasants have increased with the age, while partridge egg weight has not (Yannakopoulos, 1992). The egg weight of pheasant have been decreases together with the age but this is not important statistically and also they said that egg shell weight and egg shell thickness have been decreased together with the age. Shape index of the pheasant eggs is not changed with the age. It is also reported that the percentage of the yolk weight to egg weight have been decreased and percentage of albumen weight to egg weight, Haugh unite value have been increased with the age. The shell thickness of partridge and pheasant has been reported as 0.232 and 0.242 mm by Song *et al*. (2000), respectively.

In a study, Tserweni-Gousi and Yannakopoulos (1990), investigated to determine quality characteristics of pheasant egg, egg weight, shape index, specific gravity, albumen weight, yolk weight, shell weight and shell thickness were reported as 30.49, 80.24, 1.07, 16.10, 9.78, 3.03 g and 0.27 mm, respectively.

The evaluation of eggshell quality characteristics has been well documented for domestic fowl (Yannakopoulos and Tserveni-Gousi, 1986; Scott and Silversides, 2000) and pheasant (Song *et al*., 2000; Kirikci *et al*., 2004).

Live weight significantly affected egg weight, specific gravity, albumen index, shell weight, shell thickness, Haugh unite and albumen weight (Kirikci *et al*., 2007). Kirikci *et al*. (2004) reported that egg of pheasant egg, egg weight, shape index, specific gravity, albumen egg, shell weight and yolk weight as 31.00 g, 80.94, 0.94, 18.05 g, 3.18 g and 9.98 g, respectively. It was reported that egg quality characteristic of pheasant egg were found as egg weight 31.03 g, specific gravity 0.938, shape index 80.69, yolk index 43.19, albumen

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index 1.477, yolk weight 10.20 g, albumen weight 17.57 g shell thickness 0.242 mm, shell weight 3.22 g, membrane thickness 0.004 mm and Haugh unite 96.335 (Kirikci *et al*., 2003). In an other study (Gunlu *et al*., 2003), it is investigated to determine some quality characteristic of partridge eggs; egg weight 22.43 g, specific gravity 0.933, shape index 77.04, yolk index 47.88, albumen index 1.56, yolk weight 8.41 g, albumen weight 11.68 g, shell thickness 0.22 mm, shell weight 2.34 g, membrane weight 0.47 g, membrane thickness 0.004 mm, membrane weight 0.639 g and Haugh unite 96.94. Ozbey and Esen (2007) have been reported the values, which were obtained from partridges reared either in ground or cage were (48.42 and 44.11) for yolk index, (1.45 and 1.66) albumen index, (83.24 and 86.78) haugh unit, (2.39 and 2.86) shell weight, (8.55 and 7.89) yolk weight and (12.46 and 11.78) albumen weight, respectively and they reported the significant effect of breeding place on above mentioned egg traits ($p<0.05$).

In this study, it was aimed to determine some quality characteristics of partridge egg and pheasant eggs and also aimed to compare with component of eggs of pheasant and partridges.

MATERIALS AND METHODS

Eggs were used in this research as a research material has been obtained from pheasant and partridge raised at Veterinary Faculty Farm of Selcuk University. Totally, 160 partridge and 200 pheasant eggs were used in mid-June from a random production in this study.

The eggs were measured by digital caliper in the sensitivity of 0.001 at short and long diameters in order to designate the shape index. Later, the eggs were broken one by one on a flat layer with a waiting period of 5 min. The heights of yolk and albumen and long and short diameters of albumen and diameter of yolk were measured with caliper. The yolks separated from albumen were weighted and the weights were recorded. The shells of the broken eggs were washed under gently flowing tap water to be released from albumen residues and then they were dried in the air. They were weighted to determine their latter weights and the shell thickness at equator, blunt and pointed edges of the egg shells with membrane and without membrane they were measured with caliper. From the values obtained the data related to investigated characteristics with the aid of the below formulas (Yannakopoulos and Tserveni-Gousi, 1986) was attained.

$$\text{Shape index} = \frac{\text{Short edge}}{\text{Long edge}} \times 100$$

$$\text{Yolk index} = \frac{\text{Yolk height}}{\text{Yolk diameter}} \times 100$$

$$\text{Albumen index} = \frac{\text{Albumen height}}{\text{Long diameter of albumen} + \text{Short diameter of albumen}/2} \times 100$$

$$\text{Shell thickness} = \frac{\text{Pointed end} + \text{equator} + \text{blunt end}}{3}$$

$$\text{Shell membrane thickness} = \frac{\text{Pointed end} + \text{equator} + \text{blunt end}}{3}$$

$$\text{Haugh unite} = 100 \times \log (\text{Albumen height} + 7,57 - 1.7 \times \text{egg weight}^{0.37})$$

By means of some quality characteristics of partridge and pheasant eggs were determined in this study (Nesheim *et al*., 1979). T-test was used compare of percentage of components of egg in partridge and pheasant (Petrie and Watson, 1979). Statistical analysis has been made in the package program of SPSS11.0.

RESULTS AND DISCUSSION

Some quality characteristics of partridge and pheasant egg were given in Table 1 and the percentage of egg component of these eggs were given in Table 2.

As it was shown in Table 2, the yolk weight is higher in partridges than pheasant eggs and yolk weight percentage is higher in partridges than the pheasant ($p<0.001$). Shell weight with membranes is similar to each other.

Table 1: Some quality characteristics of partridge and pheasant (Mean±SE)

Characteristics	Partridge	Pheasant
Egg weight (g)	22.43±0.17	31.02±0.21
Shape index	77.04±0.43	80.58±0.34
Yolk index	47.88±0.54	43.52±0.57
Albumen index	1.56±0.029	1.57±0.028
Shell thickness (mm)	0.219±0.004	0.265±0.005
Membrane thickness (mm)	0.035±0.001	0.040±0.002
Shell weight (g)	2.340±0.028	3.322±0.04
Shell membrane weight (g)	0.474±0.010	0.698±0.026
Haugh unite	84.23±0.85	83.01±0.95
Yolk weight (g)	8.406±0.097	10.239±0.10
Albumen weight (g)	11.683±0.143	17.460±0.18
Specific gravity	0.933±0.0009	0.937±0.0009

Table 2: Percentage of components of egg in partridge and pheasant (Mean±SE)

Characteristics (%)	Partridge	Pheasant
Shell weight	10.44±0.10	10.75±0.14
Yolk weight	37.55±0.41***	33.05±0.29
Albumen weight	52.01±0.41	56.20±0.31***

***: ($p<0.000$)

In this study, determined egg weight of partridge is similar the reported value in literature review (Woodard *et al*., 1982; Yannakopoulos, 1992; Cetin *et al*., 1997; Kirikci *et al*., 1999; Song *et al*., 2000; Gunlu *et al*., 2003). Egg weight of pheasant is also similar the value, which was reported earlier study in the literature review. But determined egg weight in this study for partridge and pheasant is heavier than value reported for partridges and pheasant, the species of that birds were not stated, by Song *et al*. (2000). So, different species could be thought of the differences with the egg weight and different could be got live weight hens (Kirikci *et al*., 2007).

Determined average some quality characteristics value of pheasant egg is similar the shape index, specific gravity, albumen weight, yolk weight, shell weight, shell thickness value reported by Tserweni-Gousi and Yannakopoulos (1990) and Kirikci *et al*. (2007). When egg component of partridge and pheasant is compared, it is seen that shell weight percentage is similar to each other but yolk weight percentage is higher in partridge and albumen percentage is higher in pheasant ($p<0.001$) (Table 2). Song *et al*. (2000) reported the percentage of yolk weight to the egg weight in partridge and pheasant eggs, without stated the species of the birds, as 33.90 and 35.70%. These values are different from determined value in this study. The differences could be arisen from the different species.

As a result, some quality characteristics of these little known birds have been determined. Furthermore, egg component of these birds has been compared.

CONCLUSION

It could be said that more detail research could be useful in these birds for successfully intensive breeding.

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