



## Some quality characteristics of pheasant (*P. colchicus*) eggs

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### Abstract

In this study, some external and internal quality characteristics of pheasant eggs were determined. In the material of 200 eggs following values were found for quality characteristics: egg weight 31.03 g, specific gravity 0.938, shape index 80.69, yolk index 43.19, albumen index 1.477, yolk weight 10.20 g, albumen weight 17.57, shell thickness 0.242 mm, shell weight 3.22 g, membrane thickness 0.004 mm, membrane weight 0.639 g and Haugh Unit 96.335. Egg weight correlated significantly with shell thickness ( $r=0.17^{**}$ ), shell weight ( $r=0.46^{***}$ ), yolk weight ( $r=0.35^{***}$ ) and albumen weight ( $r=0.58^{***}$ ).

**Key words:** Pheasant, egg characteristics, egg quality.

### Introduction

The name pheasant is classified by World Pheasant Association (WPA) as common name of 49 species of pheasant<sup>1</sup>. Because of tasty meat of these birds, pheasant breeding have been done for hobbies. It has been reported that ring necked pheasant is most adaptable for intensive breeding and the most suitable species for breeding meat production purpose among of the pheasant species<sup>2,3</sup>. Ring necked pheasant have been widely bred as a hunting material and meat production in the world. In literature, it has been reported that 10-170 eggs have been obtained from a pheasant in a laying season<sup>4,5,6,7,8,9</sup>. While there are more studies on egg quality characteristics of domestic fowl<sup>10,11,12,13,14</sup>, there are only few studies on quality characteristics of pheasant eggs in the world. The important role of the pheasants as game birds and the problems associated with the hatchability, which may be due to the shell quality, indicates the need for more detailed research in this area. This study has been aimed to determine some egg quality characteristics of ring necked pheasant.

### Materials and Methods

**Animals:** Eggs used as research material have been obtained from 46-56 week old pheasants raised in total 12 cages in dimensions 1.2 x 1.3 x 1.0 m (6 cages in a room of 4 x 4 m) at Veterinary Faculty Farm of Selçuk University. Pheasants were fed ad libitum with a ration including 18% crude protein

**Egg quality analyses:** Eggs were collected daily and quality determination was conducted once in week (one week interval of time). Soft-shelled, cracked and small eggs have not been used as material. The egg weight registration was done one by one and they have been stored at 13°C. For each egg the specific gravity was determined by water displacement method<sup>15</sup> and the egg shape index measuring was implemented by an electronic digital calliper. Total 200 eggs were broken out to determine the weights of albumen and yolk characteristics. Specific gravity was calculated according to the following formula: Weight in air (g) (weight in air-Weight in water). After determining the specific gravity, short and long diameters of eggs were measured with a digital calliper (sensitivity

0.001) to calculate shape index. After measuring the diameters of eggs, they have been broken under well-arranged glass ground and five minutes later long and short diameters and height of both albumen and yolk were measured with electronic calliper. Separated yolks have been weighed and recorded. Shells of broken eggs were washed with water for separating of albumen remainders and air-dried. After this stage, shell weights were determined and stubby diameter, sharp diameter and equator diameter of egg with membranes were determined with calliper. These results were used in determining other characteristics of eggs according to following formulas:

Shape index =short border/long border x 100

Albumen index =albumen height /albumen diameter x 100

Yolk index =yolk height /((long diameter of yolk + short diameter of yolk)/2) 100 x 100

Shell thickness = (sharp point thickness + equator thickness + stubby thickness)/3

Shell membrane thickness =sharp point membrane+ equator membrane+ stubby membrane)/3.

Haugh Unit =100 x log (Albumen weight + 7.57 - 1.7 x egg weight x 0.37)

**Statistical analyses:** Linear correlation analysis has been used in examining characteristics of pheasant eggs<sup>16</sup>. In statistical analysis, SPSS 10.0 for windows was used.

### Results and Discussion

The average values of the examined characteristics of pheasant eggs are presented in Table 1 and correlations between quality characteristics in Table 2. In our study, the egg weight of pheasant (31.03 g) was of the same order of magnitude with values for pheasant eggs reported by Woodard and Snyder<sup>8</sup> (28.1-29.5 g), Woodard et al.<sup>9</sup> (30.6 g), Blake et al.<sup>4</sup> (31.9-34.4 g), Slaugh et al.<sup>6</sup> (31.0-32.3 g), Tserveni-Gousi and Yannakopoulos<sup>12</sup> and Çetin et al.<sup>5</sup> (33.36 g) and Song et al.<sup>17</sup> (25.79 g). However, there is variation in egg weight values found in the literature. This variation can be attributed to different genotypes of the materials used. Besides, Yannakopoulos<sup>14</sup> reported the weight of pheasant eggs as 33.39 g and expressed that the weight increased with the age of the pheasant. Specific gravity was 0.938 in this research, and there

**Table 1.** The mean value of some external and internal quality characteristics of the pheasant eggs (n=200).

Characteristics	Mean± Sx
Egg weight, g	31.03±2.26
Specific gravity	0.938±0.001
Shape index	80.69±3.14
Yolk index	43.19±4.78
Albumen index	1.47±0.30
Shell thickness, mm	0.242±0.005
Membrane thickness, mm	0.004±0.001
Shell weight, g	3.22±0.37
Membrane weight, g	0.639±0.226
Haugh Unite	96.335±3.21
Yolk weight, g	10.20±1.00
Albumen weight, g	17.57±1.86

was limited variation (Sx=0.00). The reason that there was no variation in specific gravity might be due to the fact that birds were of the same age and kept under the same environmental and feeding conditions. The specific gravity value of pheasant eggs reported by Tserweni-Gousi and Yannakopoulos<sup>12</sup> (1.07) is higher than our result. The shape index of pheasant eggs (80.69) was higher than value (78.00) reported by Song et al.<sup>17</sup> The reason for different shape indexes can be attributed to different egg weights. The reported egg weight (25.79)<sup>17</sup> was lower than our result. Yolk index, albumen index, yolk weight and albumen weight of pheasant eggs in our study were 43.19, 1.47, 10.20 g and 17.57 g, respectively. Yolk and albumen weights were similar to those (9.78 and 16.10) reported by Tserweni-Gousi and Yannakopoulos<sup>12</sup>. In our study, shell thickness and weight were 0.242 mm and 3.22 g, membrane thickness and weight 0.004 mm and 0.639 g and calculated Haugh Unit was 96.335. Our values for shell thickness and shell weight were similar to the values (0.27 mm and 3.03 g) reported by Tserweni-Gousi and Yannakopoulos<sup>12</sup>. Song et al.<sup>17</sup> reported lower value for shell thickness (0.24 mm) of pheasant eggs. Egg weight correlated significantly with shell thickness (r=0.17\*\*), shell weight (r=0.46\*\*\*, yolk weight (r=0.35\*\*\*) and albumen weight (r=0.58\*\*\*) (Table 2). In this study some relationships were found between quality characteristics, however, further detailed studies are required concerning pheasant eggs.

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**Table 2.** Some correlations between the egg weight and the other egg characteristics.

	Egg weight	Shape index	Yolk index	Albumen index	Shell thickness	Membrane thickness	Shell weight	Membrane weight	Haugh Unit	Yolk weight	Albumen weight
Shape index	0.00										
Yolk index	0.14*	0.07									
Albumen index	-0.08	0.15*	0.21**								
Shell thickness	0.17**	-0.06	-0.07	0.04							
Membrane thickness	0.02	-0.02	-0.03	-0.05	0.47***						
Shell weight	0.46***	-0.06	-0.01	-0.02	0.67***						
Membrane weight	0.00	-0.02	-0.07	0.11	0.24***	0.07					
Haugh Unit	-0.07	0.07	0.18**	0.81***	-0.03	0.15*	0.31***	0.06			
Yolk weight	0.35***	0.07	-0.07	0.00	-0.03	-0.02	0.06	0.01	-0.02		
Albumen weight	0.58***	-0.02	0.10	0.00	-0.03	-0.09	0.12*	-0.05	-0.06	0.02	
Specific gravity	-0.10	-0.02	-0.19**	-0.05	-0.00	0.04	-0.14*	0.00	-0.03	-0.03	-0.06

\*:P<0.05; \*\*:P<0.01; \*\*\*:P<0.001