CONTRIBUTIONS ON THE KNOWLEDGE OF INCUBATION EGGS PRODUCED BY ADULT PHEASANT FEMALES

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Abstract

The main goal of reproduction pheasants breeding is to re-populate hunting domains or to use them in poultry meat production.Within the intensive farming of reproduction pheasants, incubation eggs quality affects hatching results and the future performances of new-hatched chicks.The biological material included incubation eggs issued from the four main stages of laying (onset, peak, plateau, ending), specific to the adult pheasant reproduction females (ssp. Phasianus colchicus).Data processing revealed that eggs weight increased from 28.64g (laying onset) till 32.16g (ending), as well as the egg shape index (78.14% during onset, comparing to 79.22% during ending). Despite this, eggshell thickness was reduced from 0.424 mm in the laying onset to just 0.378 mm when laying ceased. This fact induced a decrease of the shell breaking strength, from 0.541 kgf/cm^2 during onset, till 0.495 kgf/cm^2 during ending. The Haugh Index, as main parameter in incubation eggs quality assessment, increased from 76.05 UH (onset) till 76.89 UH (ending). The conclusion of our study showed that quality traits of the eggs laid by pheasant reproduction females modified as their age modifies; however, better results related to incubation parameters could be achieved for the eggs laid during full maturity.

Key words: pheasant female, age, eggs, quality

INTRODUCTION

Passion for hunting, but also consumer orientation to other types of meat than conventional ne, brought into attention of specialists also birds of low economic interest, including pheasants.

Valued by hunters for their rapid flight, but also by consumers for meat with particular organoleptic qualities, pheasants are reared in intensive farms type, providing a sufficient number of live specimens to populate both hunting and slaughter units; but must mentioned the fact that live pheasants are really looking for export [1].

Operation on an intensive basis of pheasants requires the existence of a breeding sector and thus one of hatching, which ensures constant find day-old chicks to the growth one.

Although pheasants growth is achieved by scientific principles and eggs incubating is produced in modern devices, the final results of the incubation process is at quite low levels, against a background of less good quality hatching eggs, given the biological features of this species [2].

For this reason, it was found to be appropriate qualitative assessment of pheasant hen eggs from intensively farmed system in direct correlation with the hatching ability to establish a strategy targeting the hatching of eggs and subsequently produced offspring destination.

MATERIAL AND METHODS

The biological material studied was represented by 200 hatching eggs from breeding adult pheasant hen (*ssp Phasianus colchicus*) reared in intensive system at pheasant house Cornești-Iaşi County. Eggs were collected in four main phases of laying (50 eggs each), respectively: at the beginning (1st week of laying for pheasant hens); peak (5th week of laying); plateau (8th week of laying) and at the end (13th week of laying).

Assessment of main indicators defining the quality of hatching eggs was done by

classical methods of determination, as follows:

- **egg weight** was determined by individual weighing with analytical balance**;**
- **index format** was based on the ratio of small diameter (d) and high one (D) of eggs, using the formula:
  If = (d / D) x 100;
- **mineral shell thickness** was assessed using a clock comparator device, on pieces of shell taken from 3 different areas of the egg (pick, the rounded and the middle one;
- **resistance to breaking of mineral shell** was determined with a Schröder type device, based on the method of resistance to pressure;
- **Haugh index** was calculated based on eggs' weight and height of the dense white egg (measured by the clock comparator), close to the yolk.

Experimental data were statistically processed and the significance of differences was determined by variance analysis, using ANOVA method.

RESULTS AND DISCUSSIONS

1. Egg weight. The practice of artificial incubation showed that the best place for embryonic development are the eggs whose weight is the average of the respective population, but also the fact that from heavier eggs, chickens are obtained with a higher weight and a better start [5].

Data obtained showed that at the beginning of laying there was the lowest weight of eggs, only 28.64±0.860 g even in the terms of high variability of studied character (V%=21.24). In the following control periods, egg weight has moved increasingly, reaching levels of 31.02±0.564 g in the top curve of laying, 31.87±0.677 g during plateau and 32.16±0.731 g at the end of lay. In the cases analyzed, studied character was quite homogeneous, the calculated values for the variation coefficient varying between 12.85-16.06% (Table 1).

Table 1 Egg weight (g)

Specification	Statistical appraise	
	$\overline{X} \pm s_{\overline{X}}$	V%
Start of laying	28.64±0.860	21.24
Peak of laying	31.02±0.564	12.85
Plateau	31.87±0.677	15.03
End of laying	32.16±0.731	16.06
Average	30.92±0.712	16.29

For the entire experimental period, average weight of eggs was 30.92±0.712 g normal value if one takes into account that common pheasant is credited with an egg weight of 29-32g. The value of variation coefficient was, on average, of 16.29%, which corresponds to a medium of studied character variability (Table 1).

2. Index format. Eggs shape is an important quality indicator with influence on embryonic development may reduce the ability of hatching up to 70% [4].

After setting the index format has been found that there were no significant differences between the four stages of control, calculated values being 78.14±2.196% when eggs were gathered at the beginning of laying, of 78.89±1.920% at the peak of lay, of 79.09±1.922% at eggs from the plateau period and 79.22±2.251% in those obtained at the end of laying. Instead, there was a lack of uniformity of analysed character, variation coefficient recorded values characteristic of medium variability in peak and plateau curve of laying (V%=17.21%, respectively, of 17.18%), high at the end of laying (V%=20.09%) and very high at first lay (V%=26.38) (Table 2).

Table 2 Index format of eggs (%)

Specification	Statistical appraise	
	$\overline{X} \pm s_{\overline{X}}$	V%
Start of laying	78.14±2.916	26.38
Peak of laying	78.89±1.920	17.21
Plateau	79.09±1.922	17.18
End of laying	79.22±2.251	20.09
Average	78.83±2.365	21.21

Average index of shape calculated for eggs obtained in all the four stages of control was 78.83±2.365% with a very high coefficient of variation of 21.21% (Table 2).

3. Mineral shell thickness. Mineral shell is part of eggs with the highest degree of variability, particularly in terms of its thickness, heritability coefficient for mineral shell thickness is 0.30 [4].

Tests carried out showed that the largest thickness of the mineral shell, 0.424±0.013 mm, was found in eggs from the start of laying but with a high variability (V%=21.17). Later, amid lay increasing intensity and then due to lower intensity of calcium metabolism in the body of birds, this qualitative indicator showed decreasing values from one stage to another being 0.399±0.011 mm in the peak period of laying, 0.391±0.010 mm in the plateau curve and 0.378±0.012 mm only at the end of laying. The coefficient of variation calculated for the quality parameter has specific levels of medium to large variability with limits between 18.62% and 22.34% (Table 3).

Table 3 Mineral shell thickness (mm)

Specification	Statistical appraise	
	$\overline{X} \pm s_{\overline{X}}$	V%
Start of laying	0.424±0.013	21.17
Peak of laying	0.399±0.011	18.91
Plateau	0.391±0.010	18.62
End of laying	0.378±0.012	22.34
Average	0.398±0.011	20.26

On average, egg shell thickness was studied was located at a level of 0.398±0.011 mm (V%=20.26) (Table 3)

4. Shell resistance to breakage. Important for assessing the quality of eggs, mineral shell breaking resistance determines the number of eggs that are excluded from hatching (broken, cracked, etc.) and is in inverse relationship to its thickness [5].

Research conducted has shown that, naturally, at beginning of laying was recorded the highest level for this indicator, a value of 0.541±0.013 kgf/cm^2. In parallel with increased strength lay, mineral shell thickness decreased, actually led to lower its resistance to breakage. So, in the peak period of laying shell strength was 0.516±0.012 kgf/cm^2, during the plateau curve of laying was 0.503±0.012 kgf/cm^2, and at the end of the laying of only 0.495±0.011 kgf/cm^2. Character was considered non-homogeneous, values calculated for this index fluctuating between 16.59% and 17.61%, which corresponds to a medium variability (Table 4).

Table 4 Shell resistance to breakage (kgf/cm^2)

Specification	Statistical appraise	
	$\overline{X} \pm s_{\overline{X}}$	V%
Start of laying	0.541±0.013	17.61
Peak of laying	0.516±0.012	16.59
Plateau	0.503±0.012	16.87
End of laying	0.495±0.011	17.03
Average	0.514±0.012	17.02

Throughout the period of laying, average resistance to breakage of mineral shell was 0.514±0.012 kgf/cm^2, with a variation coefficient of 17.02% (Table 4)

5. Haugh index. Feature overall assessment of the quality of eggs for artificial incubation, Haugh index is based on the correlation between height white egg dense and weight of the eggs [5].

Further investigations showed that the Haugh index presented an upward trend, from the beginning to the end of laying, further increasing the weight of eggs, but also to increasing proportion of white egg in their structure. So, at eggs gathered early Haugh index value was 76.05±1.394 U.H. those from the peak period of laying it was 76.46±1.408 U.H. to those deposited in the plateau 76.58±1.374 U.H. and to eggs at the end of laying 76.89±1.614 U.H. The coefficient of variation has specific values of medium variability, its limits of oscillation being 12.69-14.84% (Table 5)

Table 5 Haugh index (U.H.)

Specification	Statistical appraise	
	$\overline{X} \pm s_{\overline{X}}$	V%
Start of laying	76.05±1.394	12.96
Peak of laying	76.46±1.408	13.02
Plateau	76.58±1.374	12.69
End of laying	76.89±1.614	14.84
Average	76.49±1.447	13.38

For the studied population, Haugh index recorded an average of 76.49±1.447 U.H. with a variation coefficient of 13.38%, specific to a medium variability (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

Data obtained by us on the hatching eggs quality of from breeding adult pheasant hen (*ssp Phasianus colchicus*) reared in intensive system led to the following conclusions:

- eggs weight increased from 28.64±0.860 g as was at first lay, to 32.16±0.731 g at the end of lay;
- index format of eggs was retained within relatively constant throughout the period of pheasant hens laying (mean = 78.83±2.365%);
- mineral egg shell thickness was reduced from 0424±0.013mm-top lay to 0.378±0.012mm- end of laying, as to entail and reducing it to break resistance from 0.541±0.013kgf/cm^2 (beginning of lay), at 0.495±0.011kgf/cm^2 (end of lay);
- Haugh index recorded an average of 76.49±1.447. U.H near to the lower limit of the recommendations on hatching eggs (74.5-89.5 U.H).

These findings enabled us to make some practical recommendations for artificial hatching of pheasants in intensive units, respectively:

- to obtain chickens kept for their queen, must be hatched pheasant eggs obtained in the peak period of laying eggs since such method ensure the security of the highest quality products;
- eggs provided from other periods of laying (beginning, end and even plateau) can be used for incubation but also for obtaining chicks for hunting areas;
- application of a rigorous selection in the breeding process in pursuit of higher production of eggs and hatching especially with high quality and uniformity.

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