Short Communication / Kısa Bilimsel Çalışma

Gross appearance of the chicken unfertilized germinal disc

Esin Ebru ONBAŞILAR1, İsmail Safa GÜRCAN2, Gülzade KAPLAN3, Fevzi Tahir AKSOY1

1Department of Animal Science, Faculty of Veterinary Medicine, University of Ankara; 2Department of Biostatistics, Faculty of Veterinary Medicine, University of Ankara; 3General Directorate of Agricultural Production and Development, Ankara.

Summary: Flock fertility could be determined by different appearances of germinal disc in fresh egg. The aim of this study was to determine the differences and the frequency of distributions in the appearance of germinal disc in fresh unfertile eggs coming from a young virgin brown layer flock. In this study a total of 354 eggs was examined. Six categories of unfertile germinal disc (UGD) were defined based on their appearance as A, B, C, D, E and F. As a conclusion, in total eggs, type A (31.9%) was the highest and type C was the lowest (6.5%) in frequency.

Key words: Chicken, unfertilized germinal disc, gross appearance.

Dölsüz tavuk germinal diskinin görünümü


Anahtar sözcükler: Tavuk, dölsüz germinal disk, görünüm.

The fresh egg examination is a method of predicting hatch potential prior to setting of the eggs. External and internal examination of the eggs will serve as an early warning system for breeder flock problems, the quality characteristics of shell, albumen and yolk, nutritional and disease status of the breeder and fertility status of the eggs (3).

Internal examination of the eggs can be made by the breakout of the culled fresh hatching eggs. Fresh egg breakout should be used when immediate fertility results are needed. When a flock is first coming in to lay or has been treated for a disease or management related fertility problem, managers often want a quick estimate of fertility (9). For the fertility estimation, appearances of unfertile germinal disc, blastoderm (fertilized germinal disc) and early dead embryo could be well recognized and differentiated (5, 10).

Arora and Kosin (1) briefly described the gross appearance of germinal disc in different avian species including chicken. They reported that presence of vacuoles in the germinal disc as the indicator of an infertile egg and presence of vacuoles in the blastoderm as an indicator of embryonic death. Some researchers (4,7) categorized the early development of the chicken embryo. The progressive development of the turkey embryo from cleavage through hypoblast formation was described by Gupta and Bakst (6). It became apparent that there were variations in the morphological appearance of blastoderm and as well as UGD in the fresh laid eggs. Gross appearance of the turkey blastoderm and UGD at oviposition also described and categorized by Bakst et al (2). They indicated that UGD were divided into six categories and were best differentiated from the blastoderms by the presence of vacuoles around its central dense area.

The aim of this study was to determine the differences and the frequency of distributions in the appearance of germinal disc in fresh unfertile eggs coming from a young virgin brown layer flock. It was assumed that the explanations of the morphological categories and their frequencies may reflect some contributions to fresh egg breakout practices.

Eggs were randomly collected four times in two weeks of intervals from uninseminated brown layer flock of 1200 hens between 26 to 32 weeks of age. The total number of eggs examined was 354. Eggs were collected once in the morning and placed in a room at 15 °C and examined in the next day.
A, B, C, D, E and F have been defined according to appearance (2) (Figure 1). Six categories of UGD and the six different morphologic categories in accordance to palm of the hand. Each time UGD was classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand.

A; It has a central, dense, small, asymmetrical, white spot which appears irregular due to numerous adjacent small vacuoles. B; Similar to A but vacuoles less conspicuous by eye. C; Has large, dense, somewhat symmetrical, white mass surrounded by a clear zone. D; Like C but has one or more vacuoles surrounding central white mass. Surrounded by a clear zone. E; Three distinct zones, a dense central white area, surrounded by symmetrical. F; Similar to E except the outer ring is more diffuse with no outer boundary (Adapted from Bakst et al., 1998).

Figure 1. Morphological classifications of the unfertile germinal disc (UGD)

Table 1. The distribution ratio of six different unfertile germinal disc (UGD)

Table 1. The distribution ratio of six different unfertile germinal disc (UGD)

<table>
<thead>
<tr>
<th>Categories of UGD</th>
<th>Time</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<tr>
<td></td>
<td>n</td>
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<td>14</td>
<td>2</td>
<td>11</td>
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<td>14</td>
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<td></td>
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<td>16.7a</td>
<td>2.4b</td>
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<td>23.8a</td>
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<td>29</td>
<td>16</td>
<td>6</td>
<td>13</td>
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<td>7</td>
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<td></td>
<td>%</td>
<td>32.2a</td>
<td>17.8b</td>
<td>6.7b</td>
<td>14.4b</td>
<td>21.1b</td>
<td>7.8b</td>
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<td></td>
<td>n</td>
<td>34</td>
<td>12</td>
<td>4</td>
<td>14</td>
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<tr>
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<td>%</td>
<td>37.8a</td>
<td>13.3b</td>
<td>4.4b</td>
<td>15.6b</td>
<td>20.0b</td>
<td>8.9b</td>
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<td>18.9</td>
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<td>15.0b</td>
<td>6.5b</td>
<td>13.8b</td>
<td>20.9b</td>
<td>11.9b</td>
<td>100</td>
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</table>

a,b Percentages of groups with different letters in the same row are significant (p<0.001).

True flock fertility determinations based on germinal disc appearances in fresh laid eggs is a practical tool for the hatchery practice that is becoming an increasingly popular recently. Gross appearance of the UGD and fertilized germinal disc (blasto) appear only on the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand. Each time UGD classified in one of the albumen and roll the yolk inside the shell or in the palm of the hand.

Egg numbers and frequencies in those categories are shown in Table 1. No significant differences were obtained among the egg collection intervals. Egg distribution differences were statistically significant among the categories (p<0.001) in the first, second, third period and in total. When analyzed all together, type A (31.9%) was the highest and type C was the lowest (6.5%) in frequency.

Figure 2. Appearance of six different unfertile germinal disc (UGD)
defined based on their appearance as A, B, C, D, E and F and type A (31.9%) was observed in the highest frequency.

These findings were almost in the same order with the findings of Bakst et al (2) on turkey UGD. Most of the authors in some pioneer papers published in between 1872 and 1961 cited the presence of vacuoles in the germinial disc as the indicator of an infertile egg (1). But in our findings no vacuoles observed by unaided eye in some of UDG categories such as type C, E and F.

As a result it may be stated that the gross appearance of UGD may be put into six different categories. These appearances may be used as a tool to differentiate an UGD from the blastoderm.

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References


Address for correspondence
Dr. E. Ebru Onbaşlar
Department of Animal Science,
Faculty of Veterinary Medicine,
University of Ankara, 06110
Dişkapı-Ankara-Turkey.
e-mail: obasilar@veterinary.ankara.edu.tr