on relatively short legs, a strong constitution, adapt well to the conditions of herd and group maintenance, have relatively high milk yield and better pay forage.

Keywords: Milk, lactation, udder, nipples, live weight, body measurements.

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THE STUDY OF QUAIL EGG INCUBATION FEATURES

Abstract

This article contents the results of studies related to quail egg incubation features. The experimental data show the possibility of extending the viability of quail embryo through short periodic exposure of higher temperatures, which is not only theoretically but also practically important in using certain industrial method for the artificial incubation.

Keywords: quail chicks, embryogenesis, embryo, egg incubation, incubator, hematopoiesis.

Introduction

Many poultry farmers who have an extensive experience in keeping domestic birds, believe they have no any troubles with quail breeding, since these birds quickly adapt to new conditions, perfectly use equipped for their breeding hen's poultry houses and can eat feeds intended for other species of birds [1]. But in fact it is not like that, despite the quails belong to the hen's species their keeping conditions are different from those made, for example, for hens. It is very difficult for a person who is not an expert, even if he/she has got advised with the experienced poultry breeder, to create a good keeping environment and full feeding.

In this regard, the thorough and comprehensive studies related to breeding the quail chicks in new environment are essential and have a great scientific and practical significance. It should be noted that taking dietary and medical - dietary drugs and the further development of this bird species is entirely dependent on number of issues solution such as the study of biological and physiological characteristics, development of feeding scientific methods, arranging the methods of keeping the advanced technology and ensuring the economic efficiency of the industry.

Materials and methods of research

A quail embryo is very sensitive to changes in physical environmental factors, particularly temperature factor. It is known that normal development of the embryo and embryo formation in quail egg progresses at a strictly certain temperature (37.5^0-37.7^0 C).

Temperature limits within which the embryo can normally develop are very few. A quail embryo is particularly sensitive to temperature increase in the early stages of development. Low, against normal, temperatures (in a range not causing yet an embryo death) during incubation cause the delay in its normal growth and reduce the vitality.

Simultaneously it is found that the prolonged egg storage, even at the optimum temperature conditions (7-8), greatly decrease the embryo ability to develop; egg storage over 6 days shows already deterioration of their incubation qualities, it means deterioration of the embryo viability, and 15-20-day eggs practically unsuitable for incubation.

In recent years, the individual studies were made to learn the ways of exposure of variable modes of physical factors on the extension of embryo viability when eggs are stored for a long time which quite often unavoidable with the large-scope incubation.

We had the objective to investigate the possibility of extending the quail eggs embryo viability during egg prolonged storage in a much higher room temperature (17-20) through a short periodic heating of eggs.

We selected 1,500 homogeneous quail eggs on the first day of laying. After rejection of broken and other unsuitable for incubation eggs, three homogeneous groups were created involving left 1,290 eggs: 450 eggs (the first group) were placed in the incubator "Incubator - 45" with the next production batch; 420 eggs (the second group) were placed in 3 trays and transferred to the egg storage where they kept for 13 days at a temperature of 17-20^{0}C; the left 420 eggs (the third group) every day were placed into the same incubator and stayed there for 2 hours for a short heating. After each such heating the trays were removed from the incubator and transferred to the same room where the second group eggs were stored. Periodic heating of the third group eggs lasted until June, 15. This batch was subjected to periodic thermal exposure for 6 times.

On June 15, the second and third group eggs were placed into the incubator and incubated under the same common mode used for the first group eggs, i.e. the incubator temperature was 37.4-37.5 ^{0}C and 58% humidity during incubation and 68% humidity during hatching.

On the 7th day the first group had 44 unfertilized eggs - 10% of total placed, 8 eggs with the blood ring - 2%. The trays had 398 eggs left. On the 15th day after the second stage there were 18 dead-in-shell, 110 addled eggs. On the 17th day of incubation we had 270 live chicks, i.e. 60% of the placed or 66.5% of the fertilized eggs.

In the second group on the first stage - 70 eggs or 16.7% were unfertilized and 2 eggs with the blood ring. The trays had 348 eggs left. After the second stage there were 19 dead-in-shell, 244 addled eggs. There were total 105 alive quail chicks, which is 25.7% of the placed or 30.2% of the fertilized eggs. In the third group of birds in the first stage, 65 eggs were withdrawn, 50 of them were unfertilized eggs and 15 were with the blood ring. After the second stage another 80 eggs were withdrawn, among them 20 were dead-in-shell and 60 were addled eggs. Among 355 eggs left we got 275 alive chicks, i.e. 74.3% of the fertilized or 65.5% of the originally placed eggs (Table 1).

Table 1. Results of studies on tests of the periodic egg heating impact on the quail chicks' survival rate and hatching

Placed eggs, pcs	Withdrawn during incubation, pcs					Hatching percentage		
	Unfertilized eggs	Blood ring	The left number	Dead-in-shell	Addled eggs	Alive chicks	Among placed eggs	Among fertilized eggs
group 1 450	44	8	398	18	110	270	60	66.5
group 2 420	70	2	348	19	224	105	25.0	30.2
group 3 420	50	15	355	20	60	275	65.5	74.3

As you can see this experimental results, the embryo survival rate and quail chicks' hatching from eggs stored for 13 days in the egg storage and every other day exposed to a periodic thermal exposure at 37.5 ^{0}C temperature was incomparably higher than the embryo survival rate and chicks' hatching from eggs stored at constant 17-20^{0}C temperature without applying periodic heating. The survival rate was even slightly higher than in the group placed in the incubator on the day of its arrival.

Noteworthy the fact that the results of periodic heating of long stored eggs had a positive impact in significantly high temperature environment compared with the recommended storage conditions (7-8 ^{0}C).

Obtained data show the possibility of extending the viability of quail embryo through short periodic exposure of higher temperatures, which is not only theoretically but also practically important in using certain industrial method for the artificial incubation.

Quail embryogenesis problem is attractive to researchers. However, there is still insufficiently investigated issue related to the extraembryonic vasculature histogenesis and hemapoiesis processes which define the embryo nutrition and breathing in early stages of development.

Results and discussion

According to above said, we had got a mission to study the hemapoiesis dynamics in the early stages of quail embryo development. For this purpose 75 Japanese quail embryos were used. Incubation of the eggs was in an incubator "Universal - 45", according to current incubation mode. Table 1 shows the dynamics of hemapoiesis in the early stages of embryogenesis (Table 2).

Table 2. Dynamics of hemapoiesis in the early stages of embryogenesis

Item	Incubation days, 24 hours	Development of the embryo vasculature
1	1-1.5	Primary blood cells appear from the extraembryonic part. 1.5-day embryos start having "blood islands" consisting of mesenchymal cells.
2	2-4.5	In the yolk sac wall the embryo blood vessels are one layer of endothelial cells. Primary blood cells are round. Mesenchyme elements, which generate "blood islands", continue to extend, the number of blood vessels increases. In the lumen of blood vessels there are hemocytoblasts, erythroblasts and prime erythrocytes.
3	4-5.5	A convergence of abdominal fold ridges occurs. Embryo rises above the yolk. Differentiation of embryonic aniages markedly enhances. The formation of entodermal canal, the liver aniage, embryonic kidney, cardiac differentiation occurs.
4	6-7.5	Folds of cell sack become more developed. Commencement of building the defined form of red blood cells. The cytoplasm has a significant number of eosinophils. During this period, the formation of blood vessels continues through blood islands located in the periphery of the yolk sack wall. With regard to other formed elements of the white blood the embryogenesis is not available in the early stages.

The quail embryos have the yolk sac aniage on the second day of incubation. Primary blood cells form from extraembryonic part of mesodermal mesenchymes located closer to an embryo than to the peripheral part of the yolk. 1.5 day old embryos start having "blood islands" consisting of accumulated mesenchymal cells. Cellular elements of the blood islands intensively extend through the mitosis. This time you can find the cell boundaries. Cells are spread more loosely, rounded, have basophilic cytoplasm, the nucleus is large, has a well-defined nuclear membrane and contains one or two nucleolus. Blood islands gradually delimit into the individual elements which are primary blood cells - hemocytoblasts. However, this time there are also such places where the vessel lumen formation precursor is the cell induration in one place and the formation of cavity a few microns away. Basophilic cytoplasm of developed erythroblasts gradually has a pinkish shade. The nuclear-cytoplasmic ratio reduces. Nucleolus decreases in size, becomes less dense and almost imperceptible. With hemoglobin accumulation the cell's volume increases and becomes the primary erythrocyte.

In 2-day embryo yolk sac wall the vessel wall is a layer of endothelial cells. Swelling and rounding of endothelial cells which apparently become the primary erythrocytes is observed. Primary blood cells are round, with a distinct nuclear membrane and nucleolus. The hematopoiesis processes at this stage of development occur intravascularly. Closer to an embryo the blood vessel histogenesis is more pronounced, while in the edges of accretion you can find predominantly the blood islands.

3.5-day embryos continue to develop the mesenchymal elements that form the blood islands. The blood islands locate around the sac wall periphery. Closer to the abdominal fold ridges the number of primary blood vessels significantly increased. In their lumen there are hemocytoblasts, erythroblasts and prime erythrocytes. Large primary erythrocytes up to 12-13 microns have a spherical shape with oxyphilous cytoplasm containing the hemoglobin. The cranial part of the yolk sac wall has less blood islands than in the middle and caudal part. Here the primary blood vessels form lakune-shaped expansion and tend to anastomosis. In some places in the embryo yolk sac wall the vascular endothelial cells expand vigorously. In some cases their cytoplasm is basophilic and contains a fine grain, in other cases- oxyphilous. There is reason to believe in transformation of endothelial cells to the blood elements.

A convergence of abdominal fold ridges occurs during five days of incubation. This time an embryo rises above the yolk. Differentiation of embryonic aniages markedly enhances. The formation of entodermal canal, the liver aniage, embryonic kidney, cardiac differentiation occurs.

Throughout the yolk sac wall that covers the yolk almost to its equator, the vasculature forms anastomoses providing the blood circulation. However, along the yolk sac periphery the blood vessels located closer to the embryo place, so a tendency to differentiation takes place. Which represented by: mesenchymal elements, surrounding vessels get thicken, some are slightly elongated and become smooth muscle cells.

Vasculature of the yolk sac is a vitelline artery which has posterior, anterior and side arborizations. Their capillaries connect with terminal venous sinuses. Anterior vitelline veins are also differentiated and anastomoses are revealed between them. Blood cells are presented with hemocytoblasts and primary erythrocytes. Thus erythrocytes had a spherical shape, the cytoplasm was oxyphilous.

Seven-day embryos have more developed yolk sac folds, which penetrates deeply into the yolk, increasing thereby the suction surface. In addition, the vasculature surface increases, because the folds have blood vessels, in which intensive intravascular hematopoiesis continues. Along with formation of primary erythrocytes at this development stage the definitive shapes of erythrocytes form. A significant amount of eosinophils are found extravascularly, in cytoplasm they are contained like large oxyphilous grain. Core of irregular shape often consists of two segments joined by an isthmus. In a blood smear from the yolk sac vessels along with barophilic erythrocytes you can find polychromatophilic ones.

The presence of extravascular eosinophils, apparently determines the detoxication role of blood elements in the developing embryo. With regard to other formed elements of the white blood the embryogenesis is not available in the early stages. Formation of blood vessels continues through blood islands located in the periphery of yolk sac wall.

By the end of the embryonic period, the allantois vascular system, along with the yolk sac vascular system, start being engaged in the embryo gas exchange. Developing allantois covers with its surface the yolk sac wall, which blood vessels isolate a contact with the inner surface of the put amen. As a result, the yolk sac vasculature cannot provide gas exchange for the embryo, the embryo gas exchange function is made through the chorioallantoic vasculature. In this stage of development, we have not discovered the hematopoiesis in the embryo internal organs.

Within the study we identified that the embryos developing in thermal-contrast mode of incubation had more developed vascular system than embryos growing in a thermal-stable environment.

Data on histological study of the quail embryos' hematopoietic organs showed that the change in external conditions of incubation enhances their functional activity. By the final period of incubation, the embryos in the control group had 4-5 folds in bursa of Fabricius covered with epithelium. Taking into account the arrangement of epithelial layer and cellular elements

schizogony (subject to international histological classification) cloacal sack epithelium can be described as multi-row cylindrical. In the lamina propria we observed thin collagen and reticular fibers, in their loops there were heterophils and eosinophils.

In the experimental group compared to the control one, under the bursa of Fabricius epithelium you can see much more. There were a number of developing follicles, homogeneous in their cellular structure. These gemmules are surrounded by a network of connecting tissue fibers with a high concentration of heterophilic cell together with eosinophils.

Conclusions

Thus, according to the experimental data, it was found as follows:

- in the early stages of the quail embryogenesis the primary vessel histogenesis in the yolk sac wall occurs through the blood islands. For the first time the quail hematopoiesis begins intravascularly in the yolk sac wall in very early stages of embryogenesis and it is primarily presented by erythropoiesis. Herewith the hemocytoblasts are the source for development of blood cells. However, we do not exclude the possibility of primary red blood cell formation from vascular endothelial cells.

On the seventh day of incubation, we reported the beginning of extravascular hemapoiesis process with eosinophilic granulocyte generation.

It was revealed that the processes of hematopoiesis in the quail embryo internal organs begin on the eighth day of incubation, and erythropoiesis finishes intravascularly, milopoez - extravascularly.

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ИЗУЧЕНИЕ ОСОБЕННОСТЕЙ ИНКУБАЦИИ ПЕРЕПЕЛИНЫХ ЯИЦ

Аннотация

В данной статье приведены результаты исследований особенностей инкубации перепелиных яиц. Приведенные экспериментальные данные указывают на возможность продления жизнеспособности перепелиного зародыша путем кратковременного периодического воздействия повышенных температур, что имеет не только теоретическое, но и определенное практическое значение применения промышленного метода при искусственной инкубации.

Ключевые слова: перепелята, эмбриогенез, эмбрион, инкубация яиц, инкубатор, гемопоэз.

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БӨДЕНЕ ЖҰМЫРТҚАЛАРЫН ИНКУБАЦИЯЛАУ ЕРЕКШЕЛІКТЕРІН ЗЕРТТЕУ

Андатпа

Бұл мақалада бөдене жұмыртқаларын инкубациялаудың ерекшеліктерін зерттеу нәтижелері келтірілген. Келтірілген эксперимент нәтижелерінің көрсетуі бойынша бөдене эмбрионының өміршеңдігіне жоғары температураның периодты әсерінің мәні тек теориялық емес және өндірістік практикалық инкубациялауда да мәні зор.

Кілт сөздер: бөдене, эмбриогенез, эмбрион, жұмыртқаны инкубациялау, инкубатор, гемопоэз.

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УБОЙНЫЕ ПОКАЗАТЕЛИ ИНДЕЕК ПРИНИМАВШИЕ В РАЦИОНЕ КОРМОВУЮ ДОБАВКУ ФЕЛУЦЕН

Аннотация

В статье приводятся результаты убойных показателей индеек принимавшие в рационе кормовую добавку Фелуцен.

На основании исследовании по сравнению с контрольной группой живая масса во второй опытной группе составляет на 7,5% ,а в третьей опытной группе на 9,2% выше. Результаты убоя показали, что во всех группах получены вполне стандартные по массе туши. Убойный выход мяса в первой контрольной группы составил 76%, во второй контрольной группе 78%, в третьей контрольной группе 81%. Таким образом, на основании наших исследовании видно, что для повышения производства мясо индеек рекомендуем использовать в рационе кормовую добавку «Фелуцен» 15 граммов на 1 голову.

***Ключевые слова**:* фелуцен, мясо индейки, рацион, кормовая добавка, убойный выход,витамины, калорийность, минералы, холестерин.

Введение

Индейка – самая крупная из всех домашних птиц. Взрослая самка может весить ни много ни мало 35 кг. Вес тушки может достигать десяти килограмм, а самая маленькая вытягивает минимум на пять кило. И все это не только вкусное, но и замечательно полезное мясо. В современном мировом птицеводстве производство индейки является очень масштабным и занимает второе место после выращивание бройлерных кур. По своей массе взрослые особи данного вида в среднем достигают до тридцати пяти килограммов, однако в пищу употребляют мясо более молодых индеек. В основном, выращивают индейку не более шестнадцати недель — за это время масса тушки вырастает до десяти килограммов, а мясо имеет наилучший вкус. Как правило, в мясном производстве используются гибридные породы, которые являются более неприхотливыми, и, к тому же, интенсивно растут и прибавляют в весе [1]. Мясо индейки – это ценный продукт, вкусовые качества и полезные свойства которого обеспечивают