Prevention of diseases of growing of replacement young chickens kept in cages

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Abstract. Acute and chronic diseases of the extremities (arthrosis, arthritis, necrosis of the thighbone, dislocation, injury, etc.) of chickens, especially of roosters, with their subsequent raising and keeping in cages, cause significant economic damage to poultry farms. The article presents the results of scientific and production experience consisting in using non-steroidal anti-inflammatory medications “Paracetam-AVZ” and “Ketoquin 10%” for the prevention of limb diseases in the terms of raising chickens of cross Hisex Brown in the cages. The studied medications contributed to an increase in the live weight in the experimental group: females – by 3.8% (P <0.05), males – by 6.6% (P <0.05), homogeneity in the live weight of females – by 2.3%, males – by 15.6% compared with the results in control group. The safety of males taking into account mortality and culling in the experimental group exceeded this parameter in control group by 6.3%. At the same time, the number of rejected males due to limb disease in the experimental group was 2.2 times lower than in the control group. Evaluation of the development of reproductive organs showed that in males the difference in testes mass in favor of the experimental group was 16.7% (P <0.01), the length of the oviduct in chickens was 20.8% (P <0.01). Thus, the use of the studied medications had a positive effect on the development of the reproductive organs of hens and roosters in the experimental group, which accelerated their sexual maturation and increased the intensity of egg-laying.

1. Introduction
Poultry farming is one of the most rapidly growing sectors of animal husbandry in the world. Keeping poultry of the egg production direction in cages is a priority due to a number of factors, including the improvement of the production and veterinary-sanitary structure. When chickens raised and kept in cages, they are isolated from the contact with droppings, which protects chickens from infection received from bacterial microflora contained in the litter and ensures a high level of air purity in the hen house. An important factor of the keeping chickens in cages is the reduction of feed consumption for the manufacturing of a unit of production by 10-15% due to the restriction of the movement of the chickens, in comparison with this parameter in terms of the floor keeping [1-11].

Despite the observance of all the necessary requirements for the keeping and growing poultry in cages, roosters quite often have problems with the limbs (inflammation of the joints caused by various reasons). As a consequence the painful reaction lowers their reproductive function and increases culling from the flock and worsens the key criteria for the efficiency of growing of replacement young animals: live weight, homogeneity and safety of livestock, development of reproductive organs. Sedentary and
inflamed joints are observed in both roosters and chickens, and prevention and treatment of diseases are an urgent need in industrial poultry farming [12-14, 22].

Against the background of the hereditary predisposition of the chickens of the cross Hisex Brown, in the process of growing of replacement young, aged 40 days and older, the poultry shows limb deformation and, as a result, inflammation in the joints. With the progression of the disease, modern industrial technologies for raising poultry, both in our country and abroad, provide for the widespread use of antibiotics. However, due to a violation of the order of the intended use, antibiotics accumulate in animal products (milk, meat, eggs). Regular consumption of such products leads to the fact that many human diseases do not respond well to antibiotic treatment, as new strains of bacteria resistant to antibiotics appear. According to British scientists, more than 25 thousand people die annually from antibiotic-resistant bacteria only in Europe [15-20]. In this regard, the search for alternative solutions, including antimicrobial drugs, continues to this day [21]. Replacing antibiotics with drugs with anti-inflammatory and antipyretic properties became the basis of our research, the objective of which was to study the effectiveness and to determine the possibility of replacing the previously used drugs Farmazin and Tylosin 50 with the drugs "Paracetam-AVZ" and "Ketoquin 10%".

2. Materials and methods
The scientific and production experience was carried out on the ground of agricultural enterprise Agrofirma Vostok, in a reproducer of the II order for breeding the Hisex Brown cross SP Svetly, on replacement young growth of the parent flock.

To conduct the experiment two groups of replacement young poultry were formed: control and experimental, in which hens and roosters were raised separately. The features of preventive treatment of poultry in each group are presented in table 1. The duration of the experiment was 15 weeks.

Table 1. The scheme of experiment.

| Groups          | Sex    | Numbers of chickens | Age of chickens (in days), when medications were applied | Features of the preventive treatment                                      |
|-----------------|--------|---------------------|---------------------------------------------------------|------------------------------------------------------------------------|
| Control group   | female | 26678               | 40-42, 93                                               | Water-soluble pharmasin – 1 g/l of water (received with drink)          |
|                 | male   | 1144                | 40-42, 54, 93                                           | Tylosin 50 - 0.2 ml (received with injection)                           |
|                 | female | 26835               | 40-42, 91-93                                           | Water-soluble pharmasin – 1 g/l of water (received with drink)          |
|                 |        |                      |                                                        | Tylosin 50 - 0.2 ml (received with injection)                          |
|                 |        |                      |                                                        | Paracetam-AVZ - 0.5 ml/l of water (received with drink)                 |
| Experimental    | male   | 1223                | 40-42, 91-93                                           | Ketoquine 10% - 0.1 ml (received with injection)                       |
|                 |        |                      |                                                        | Paracetam-AVZ - 0.5 ml/l of water (received with drink)                 |
|                 |        |                      |                                                        | Ketoquine 10% - 0.1 ml (received with injection)                       |

The tested medications were:

- "Paracetam-AVZ", which belongs to the group of analgesic, antipyretic non-steroidal drugs – the active ingredient of which is paracetamol (AVZ company, Russia). The drug has an analgesic, antipyretic and moderately pronounced anti-inflammatory effect. Also this
medication hinders the excitability of the thermoregulatory center, inhibits the synthesis of prostaglandins and inflammatory mediators;
• "Ketoquin 10%" belongs to the group of non-steroidal anti-inflammatory drugs, the active ingredient of which is ketoprofen (AVZ company, Russia). Ketoprofen is a propionic acid derivative, it has anti-inflammatory, analgesic and antipyretic effects, inhibits platelet aggregation. The mechanism of action of ketoprofen is based on the inhibition of the synthesis of prostaglandins as a result of the effect on the cyclooxygenase and lipoxygenase pathways of the arachidonic acid metabolism and stabilizes the lysosomal membranes. At the same time, there is a decrease in the activity of neutrophils in animals with arthritis.

Throughout the experiment the following parameters were considered: the live weight of the poultry (weekly), mortality with determination of the reasons (daily), the homogeneity of the live weight of the experimental livestock, the development of reproductive organs: the mass of the testes in males and the length of the oviduct in females at the age of 14 weeks.

3. Results and discussion
The live weight of hens and roosters exceeded the standards provided for this cross in both groups, while the difference in favor of the experimental group was significant and amounted to: in females – 3.8% (P <0.05) and in males – 6.6% (P <0.05) compared to the control group (table 2).

| Age (in weeks) | Groups | | | |
|---------------|--------|--------|--------|--------|
|               | Control group | Experimental group | | |
|               | female | male | female | male |
| 1             | 64.3   | 62.4  | 64.8   | 66.1   |
| 2             | 100.0  | 100.2 | 103.5  | 105.3  |
| 3             | 151.5  | 155.1 | 152.2  | 156.5  |
| 4             | 245.1  | 289.3 | 263.4  | 290.3  |
| 5             | 338.3  | 339.5 | 356.0  | 415.3  |
| 6             | 446.1  | 547.3 | 464.3  | 552.7  |
| 7             | 561.6  | 702.7 | 576.8  | 720.7  |
| 8             | 678.4  | 867.2 | 708.1  | 875.0  |
| 9             | 806.2  | 1090.2| 819.2  | 1095.3 |
| 10            | 921.2  | 1266.8| 945.0  | 1280.1 |
| 11            | 1039.9 | 1415.6| 1068.1 | 1441.2 |
| 12            | 1114.0 | 1539.0| 1142.2 | 1633.2 |
| 13            | 1200.1 | 1622.1| 1213.5 | 1672.3 |
| 14            | 1244.2 | 1713.2| 1285.5 | 1730.2 |
| 15            | 1355.1 | 1792.6| 1360.2 | 1911.2 |

The homogeneity in the live weight of chickens in the experimental group was 88.3%, which is 2.3% higher than in the control group, roosters – 85.6%, with a difference of 15.6%.

The safety of roosters, taking into account mortality and culling, in the control group was 85.5%, in the experimental group – 91.8%, with a difference of 6.3%. At the same time, the number of rejected males due to limb disease in the experimental group was 2.2 times lower than in the control group. The safety of females in both groups was high and amounted to 99.47% for the entire period of growing in the experimental group, and 99.13% in the control one, which significantly exceeded the safety of males. The main reason for the deaths and culling of males was the deformity of the extremities.

Evaluation of the development of the reproductive organs of the experimental replacement young animals at the age of 14 weeks showed that the mass of testes in males was 0.7 g in the experimental group and 0.6 g in the control group, with a difference of 16.7% (P <0.01 ). The length of the oviduct in chickens from the experimental group was 14.5 cm, which is 20.8% higher than in the control (P <0.01).
In the future, the productivity of chickens at the age of 20 weeks in the experimental group was 50.9%, which is higher than in the control one by 1.7%. Thus, the use of the studied medications had a positive effect on the development of the reproductive organs of chickens and roosters in the experimental group, which synchronized their sexual maturation.

All the above can be confirmed by the result of the white blood cell differential of the experimental young chickens, which clearly shows a decrease in inflammatory processes and an increase in the immune status in the body. In the experimental group, the content of white blood cells in males decreased by 4.8% (P <0.01), in females by 3.7% (P <0.05), neutrophils – by 5.7 (P <0.01) and 4.2% (P <0.05), platelets – by 5.2 (P <0.01) and 4.7% (P <0.05), respectively. The total level of granulocytes increased in males by 6.3 (P <0.01), in females by 5.4% (P <0.01).

4. Conclusion
The results of the research allow us to conclude that the drugs "Paracetam-AVZ" and "Ketoquin 10%" turned out to be more effective in comparison with the previously used medications – Farmazin water-soluble and Tylosin 50, and can be recommended for use in growing replacement young birds of parental stock of the cross Hisex brown for the prevention of joint diseases.

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