



Slovak international scientific journal

№51, 2021

Slovak international scientific journal VOL.1

The journal has a certificate of registration at the International Centre in Paris – ISSN 5782-5319.

The frequency of publication – 12 times per year.

Reception of articles in the journal – on the daily basis.

The output of journal is monthly scheduled.

Languages: all articles are published in the language of writing by the author.

The format of the journal is A4, coated paper, matte laminated cover.

Articles published in the journal have the status of international publication.

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1000 copies

Slovak international scientific journal

Partizanska, 1248/2

Bratislava, Slovakia 811 03

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ЕЙМЕРИОЗ ИНДЮКОВ, ЕГО РАСПРОСТРАНЕНИЯ, ПАТОГЕНЕЗ И МЕРЫ БОРЬБЫ

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EIMERIOSIS OF TURKEYS, ITS DISSEMINATION, PATHOGENESIS AND CONTROL MEASURES

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Аннотация

Птицеводство является одной из наиболее рентабельных и высокопроизводительных отраслей сельского хозяйства. В то же время особенностью промышленного птицеводства является высокая концентрация птицы на ограниченных площадях, что приводит к значительному распространению паразитарных заболеваний хозяйства. Таким опасным заболеванием, особенно для индюков, остается еймериоз. Это заболевание является причиной массовой гибели птицы, а убытки могут составлять даже миллионы долларов. Проблема заключается в том, что еймериоз развивается на фоне пониженного иммунного статуса птицы и осложняется патогенными микроорганизмами. При этом возникают тяжелые формы паразитозов, которые и вызывают гибель птицы и, в частности индюков хозяйства. На современном этапе развития ветеринарной науки наиболее эффективными средствами по еймериозу птицы остаются специфические химиопрепараты, которые блокируют эндогенные стадии развития паразитов. Сейчас в практике ветеринарной медицины применяют более тысячи химических веществ с Антикокцидийным действием, но их количество не решает проблему резистентности самих эймерий. В связи с этим возникает необходимость в периодической ротации хозяйства.

Abstract

Poultry farming is one of the most profitable and highly productive sectors of agriculture. At the same time, a feature of industrial poultry farming is the high concentration of poultry in limited areas, which leads to a significant spread of parasitic diseases of the farm. Such a dangerous disease, especially for turkeys, remains eimeriosis. This disease is the cause of mass death of the bird, and damages can be as much as millions of dollars. The problem is that eimeriosis develops against the backdrop of reduced bird immune status and is complicated by pathogenic microorganisms. In this case there are severe forms of parasitocenoses, which cause the death of the bird and, in particular, turkeys of the economy. At the present stage of the development of veterinary science, the most effective remedies for avian poultry are specific chemotherapeutic agents that block the endogenous stages of parasite development. At present, over a thousand chemicals with anticoccidial action are used in veterinary medicine, but their number does not solve the problem of resistance of the Eumerias themselves. Due to this, there is a need for periodic rotation of the farm.

Ключевые слова: еймериоз, индюки, распространение, патогенез, патологические изменения, диагностика, лечение.

Keywords: eimeriosis, turkeys, spread, pathogenesis, pathological changes, diagnosis, treatment.

Formulation of the problem. Pathogens of eimeriosis have a pronounced immunosuppressive effect on the body of poultry [1, 2]. Therefore, the creation and use of drugs that have the ability to increase the natural resistance of poultry, its immunobiological reactivity and resistance to technological stress and chemoprophylaxis is a topical issue in today's industrial poultry industry [1, 2, 3, 4]. Despite reports of the spread of Eimeriosis in turkeys, there are still unclear issues. The area of pathogens remains insufficiently studied. Incomplete and contradictory reports on the effects of eimeriosis on turkeys are incomplete. Clinical signs in subacute and acute spontaneous invasion, morphological and biochemical parameters of blood, pathological-anatomical and histomorphological changes in turkeys are not fully understood. Therefore, it encourages researchers to study the pathogenesis and

search for new, more effective, scientifically and economically sound methods of diagnosis, treatment and prevention of turkey eimeriosis.

The purpose of research. To study the spread of eimeriosis of turkeys, to establish the effect of pathogens on their body and to develop scientifically sound measures to combat this invasion.

Distribution and pathogenesis of eimeriosis. Eimeriosis of turkeys is an invasive disease caused by a large number of species of unicellular organisms belonging to the type Protozoa, class Sporozoa, subclass Coccidiomorpha, species Coccidia, genus Eimeria [5]. More than nine species of turkey eimeriosis are currently known, seven of which belong to the genus Eimeria, one species to the genus Cryptosporidium and one to the genus Isospora [5]. The key in the pathogenesis of eimeriosis is that the parasite multiplies at the

endogenous stage of development and destroys the intestinal epithelial cells of birds. Oocysts that come out with the droppings of sick birds, under favorable conditions, are divided into four sporoblasts, which turn into sporocysts, in each of which two sporozoites are formed. Upon completion of their maturation, sporocysts become invasive. The bird is infected by swallowing (alimentary), with food or water [5, 7, 8]. Eimeriosis has two periods. The first period - from the moment of invasion of the bird to the formation and release into the environment of the first oocysts and is called prepatent. The second period - from the appearance of the first oocysts to the moment of their complete disappearance, ie until the end of the selection of oocysts with bird droppings and is called patent [6, 7]. One sporulated oocyst of *Eimeria* in the process of merogonia is able to isolate from 88 thousand to 2 million of its kind [7]. A number of authors note that a sick bird secretes from 9 to 980 million oocysts per day, with the death of up to 500 million intestinal epithelial cells [5, 6, 7]. When the walls of the digestive tract are damaged, capillaries and blood vessels are also destroyed, which leads to a violation of metabolic processes throughout the body. Damage to the mucous membrane can cause bleeding, anemia, which in most cases are fatal. Pathogenic microflora penetrates into the affected areas, which exacerbates the course of the invasion, causes necrosis of the intestinal mucosa and provokes the development of diarrhea. This process leads to depletion of the body of the bird, congestion and edema of various organs and tissues.

Eimeriosis is more common in birds during the warm and humid periods of the year, because high humidity and heat create favorable conditions for the maturation and preservation in the environment of eimeria oocysts. Seasonal fluctuations are clearly traced in farms where poultry is raised in violation of veterinary and sanitary and zoohygienic conditions of keeping and feeding. According to the industrial method of poultry farming, seasonality has no clear boundaries - in this case, the nature of the enzootic is often determined by the peculiarities of the technology of poultry production. The source of the invasion are sick chickens and adult birds - Eimerionosis. Infection occurs through food: by ingestion with food or water sporulated oocysts of *Eimeria* (invasive stage). Infection of birds with unsporulated oocysts is impossible. Mechanical factors in the transmission of Eimeric oocysts include care items, equipment, packaging used to transport poultry and poultry products, as well as service personnel, as well as rodents, synanthropic birds and insects. Most often, morbidity and mortality from eimeriosis are registered in chickens from 2-3 weeks of age to 6-8 weeks. From 1.5 to 2 months of age, eimeriosis is rare in chickens due to the development of immunity. When kept in cages, chickens are not as intensively infected with the pathogens of eimeria as they are during floor keeping: in this case, the age dynamics of eimeriosis varies depending on the sanitary condition of the poultry house, ambient temperature and humidity. In most cases, the uneven distribution of eimeriosis and its relatively easy course are noted during cell maintenance (compared to the floor content). The greatest threat to

the spread of the disease are congestion, high humidity in the premises, poor feeding and more. During the floor keeping of young animals, contact of different age groups causes the spread of this infestation in poultry farms. The high level of invasion is facilitated by the stability of the eimeric oocysts themselves, which under favorable conditions can remain viable for a long time.

The incubation period lasts four to seven days. The course of the disease is acute, subacute, chronic and subclinical (in adult birds). The main economic losses of poultry farmers are from subclinical eimeriosis - about 70%! In the acute course of the disease in chickens at the beginning of the disease register depression, low activity, most of the time they sit, get lost in groups (photo 1). The appetite of chickens is reduced, the main clinical sign is a pronounced thirst. Within one or two days from the onset of suppression, the feathers become disheveled, dull, and the wings are lowered. The crest, earrings and mucous membranes are pale. The skin becomes thin, transparent, dry. Two or three days after the onset of symptoms of depression, diarrhea appears: the manure is liquid, its color is initially pale green, then dark brown with traces of blood. With the appearance of blood impurities in the manure of chickens, the body temperature rises (by 1... 2 ° C). They quickly lose weight, the degree of depression of the general condition of the bird's body increases. The chickens sit with their eyes closed and their heads drawn in, they sleep most of the day. The gait becomes shaky. Three or four days after the onset of diarrhea, the bodies of sick chickens begin to shake periodically. In some of them there are disorders of the central nervous system, manifested by paresis, paralysis. Death occurs on the second or seventh day from the onset of diarrhea and can reach 100% of the herd. The recovered bird lags behind in growth and has a reduced body weight. In the subacute course, clinical signs are less pronounced. Chickens are thin, diarrhea alternates with the release of formed feces. The disease lasts two to three weeks, mortality does not exceed 50%. The chronic course of eimeriosis lasts several months and is characterized by similar clinical signs. Sterile immunity is formed in diseased birds. Chicken carcasses have clear signs of exhaustion. The feathers around the cloaca are contaminated with liquid feces. Visible mucous membranes, crest and earrings are pale. The most pronounced changes in the intestine.

The diagnosis of eimeriosis is established comprehensively. Finally, the disease is diagnosed by the results of laboratory microscopic examinations of faecal samples by flotation methods (more often - Fuleborn or Kotelnikov) - detect eimeria oocysts. During the pathological and anatomical autopsy, a microscopic examination of the scrapings of the intestinal mucosa is performed. Eimeriosis of chickens should be differentiated from pullorosis, trichomoniasis, histomonosis, colibacillosis. Therapeutic and preventive measures The most important measures to prevent eimeriosis are immunoprophylaxis and timely treatment aimed at increasing the natural and specific resistance of birds to the pathogen. For the treatment and prevention of chicken pox use specific chemotherapeutics, which by

their effect on the mechanism of immunity are divided into two major groups: Ⓔ drugs that inhibit the formation of immunity (eimericides); Drugs that do not interfere with the formation of immunity (eimeriostatics). Eimericides are used for prophylaxis in poultry farms throughout the fattening period and are excluded from the diet four to five days before slaughter. *Eimeria* is characterized by the ability of the pathogen to quickly adapt to the action of drugs (after three to five years, new drugs become ineffective), which encourages professionals to constantly use drug rotation programs. Prolonged use of eimeriostatics leads to the emergence of drug-resistant strains of *eimeria*. To increase the effectiveness of treatment of eimeriosis pre-study the spectrum of sensitivity of birds to drugs. One of the effective means of treating avian eimeriosis is Baycox (active ingredient - toltrazuril) - a new generation drug that acts on all intracellular stages of *eimeria*. According to the results of research by many scientists and their own observations, the bird withstands treatment with this drug, it is combined with feed additives, vitamins and medicines, without affecting their properties. Prevention of avian eimeriosis is based on the implementation of a set of general zooveterinary and special anti-eimeric measures, which include: isolated keeping of young from adult poultry in separate production areas in dry rooms on a mesh or clay floor; keeping young animals up to 60-90 days of age in cages; complete feeding with feeds balanced for all nutrients, especially vitamins A, D, K, group B and minerals (cobalt chloride, copper sulfate, manganese sulfate); daily removal of manure from the poultry farm for biothermal disinfection. Of particular importance in the prevention of eimeriosis is the disinvasion of poultry (floors, walls and equipment). In order to prevent eimeriosis, chemoprophylaxis is performed using eimeriostatics. It is advisable to use them according to special schemes (rotation), which allows to inhibit the development of resistance to a particular drug in the simplest. At the same time, drugs should be alternated in such a way that when they are replaced, the next mechanism of action on endogenous stages of pathogens differs from the previous one. In breeding and egg farms, prophylactic drugs that do not interfere with the formation of immunity are used for half a dose, starting from 10–15 days of age, for 50–60 days. In the case of caged chickens, it is advisable to use eimeriostatics within 10 days from the time of their transfer to acclimatizers, colonial shop. If necessary, after three days, the drugs are re-used. When keeping young animals on the floor, eimeriostatic drugs are prescribed from 10 to 15 days of age for two to three 10-day courses with an interval of three days. When growing broilers in deep, constant litter, the drugs are prescribed from 10-15 days of age every day and end three to five days before slaughter.

Research results. Biochemical studies have shown that eimeriosis in 20-day-old chickens caused by *E. tenella* causes a decrease in the level of free amino acids in blood plasma and an increase in erythrocytes with a significant decrease in the number of erythrocytes themselves [1,2,3,4]. In the body of a bird with eimeriosis there are significant changes in the metabolism of DNA and RNA in organs rich in lymphoid cells,

as well as in the localization of the eimerias themselves. Simultaneously with the activation of DNA synthesis, researchers note the synthesis of RNA in these organs [8]. Clinical manifestations also play an important role in the pathogenesis of eimeriosis. According to the literature, the incubation period ranges from 4 to 6 days. The invasion can be acute, subacute or chronic, but more often asymptomatic. The nature of the invasion in birds depends on many factors and, above all, on the conditions of feeding and keeping, the type and amount of the pathogen that caused the infection, the state of the organism and other factors [4, 5]. In the acute course of the invasion, the clinical manifestations are characterized by depression, a sharp decrease or complete loss of appetite and thirst. Turkeys often stand with their wings down, their heads drawn in and their eyes closed. During the movement there is a shaky gait. They respond poorly to external stimuli. The feathers are disheveled, the area around the cloaca is contaminated. Feces are liquid, brown or black, with admixtures of mucus and blood. The disease lasts 2–4 days, after which the bird dies [5].

Acute course is often recorded in the floor of poultry [6]. At a subacute course clinical signs are expressed a little less. Turkeys are depleted, diarrhea alternates with the release of formed feces. The disease lasts 2-3 weeks, mortality does not exceed 50% [5, 6]. The chronic course of eimeriosis lasts several months and is characterized by similar clinical signs. Non-sterile immunity is formed in a sick bird [4, 5, 6, 7, 8]. The complexity of the pathological process depends on the dose of invasion. At invasion of turkeys of *E. meleagridis* there is a disturbance of processes of absorption in a small bowel, and at infection of *E. adenoides* - in a caecum. *E. meleagridis* and *E. adenoides* are considered highly pathogenic species, *E. dispersa*, *E. meleagridis*, *E. innocua* and *E. subrotunda* - weakly pathogenic [4].

For experimental studies, 2 groups of 15 turkeys in each were formed. Studies have shown that the turkeys in the experimental group were clinically healthy throughout the experiment. The clinical course of eimeriosis was observed only in turkeys of the experimental group. In turkeys from 3 days showed depression, loss of appetite and well-defined thirst. Turkeys stood or sat with their wings down, their heads drawn in, and their eyes buried. Shaky gait and reduced reaction to external stimuli were noticeable. The visible mucous membranes were pale pink. Their feathers were disheveled, and the area around the sewer was contaminated with manure. Manure in sick turkeys was liquid, brownish-black with mucus and blood. At 5 or 6 days sick turkeys died. Thus, visible clinical signs, in our opinion, indicated the acute course of eimeriosis in turkeys.

Due to the severity of the pathological process caused by the causative agents of eimeriosis and the problem of their resistance to antiprotozoal drugs with long-term use, the poultry industry needs constant search and development of new chemotherapeutic drugs. According to the results of studies in experimentally infected turkeys of the experimental group for 20 days clearly showed clinical signs of invasion and were characterized by anemia of the mucous membranes,

combs, earrings and conjunctiva. Feathers and skin, from the breast to the cloaca, were contaminated with manure. The manure was liquid and contained impurities of mucus and blood. Turkeys looked depressed, sat more with their wings down, did not eat food, but drank water. At pathological and anatomical dissection of

corpses of turkeys depletion was noted. The skeletal muscles were flabby. Significant inflammatory changes were found in the duodenum (localization of *Eimeria meleagrimitis*), appendages (*E. adenoides*). On the serous membrane of the duodenum clearly visible dark red hemorrhage Fig.1.

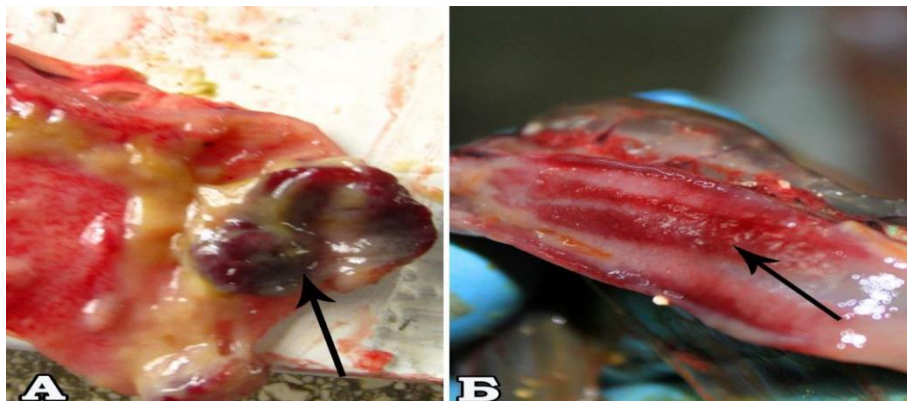


Fig.1. Spotted hemorrhages on the serous membrane (A), edema of the mucous membrane with punctate hemorrhages (B).

The development of organ pathology in many invasions, including eimeriosis of turkeys, has not been studied enough. But this kind of pathological process often leads to their death. Structural-functional, pathological-anatomical and pathological-histological studies are of great importance in the study of pathogenetic mechanisms of the disease [1,2]. Therefore, studies of the nature of lesions of the organs of immunogenesis in eimeriosis are of great scientific and practical importance. In eimeriosis there is a suppression of the general resistance of the body of birds, and in particular turkeys [4]. There is a negative impact of pathogens on individual hematological parameters and nonspecific resistance [8]. However, the pathogenetic features of the development of eimeriosis, as well as properly and timely treatment and prevention measures to restore and increase the overall resistance of the bird and, in particular, turkeys, through the introduction of immunostimulatory drugs.

Conclusions. The results of research and literature data show that eimeriosis of turkeys is a fairly common disease in farms of various forms of ownership and capacity of Ukraine, as well as European and other countries [4]. The disease causes significant economic damage to farms and their owners not only due to the lag of turkeys in growth and development, increased feed conversion, but also the significant death of young animals [3, 4]. Thus, eimeriosis is the cause of 5–10% of turkey deaths, and the losses from subacute flow are much greater and amount to hundreds of millions of dollars worldwide [1]. Turkeys that have relapsed with eimeriosis are extremely vulnerable to concomitant infections that occur against the background of the immunosuppressive state of their body [5]. That is why the problem of eimeriosis requires a more comprehensive approach with the creation of a sound program to combat this disease [4]. The results of epizootic surveys of turkeys over the past ten years have shown that eimeriosis in Ukrainian farms has increased significantly. The highest degree - 75% of poultry infestation was found

in farms of Kharkiv, Sumy, Poltava, Dnipropetrovsk and Donetsk regions. At the same time, in the farms of Odesa, Mykolaiv and Kherson oblasts the degree of damage was also high - 68%, slightly lower in Kyiv - 38.1% and Cherkasy oblasts - 48.1% [4].

The results of our monitoring studies on age and seasonal dynamics in key aspects coincide with the data of domestic and foreign researchers who have studied this problem in recent years. In most farms and home-steads, where turkeys are kept on the floor using grazing, eimeriosis was registered throughout the year [4]. More often the bird gets sick in warm and humid periods of the year (depending on a geographical zone these periods are various). This is due to the fact that high humidity and heat create receptive conditions for maturation and preservation in the environment of oocysts of *Eimeria*. However, seasonal fluctuations are clearly observed in farms where turkeys are kept in violation of the technology of their cultivation, unsatisfactory veterinary and sanitary and zoohygienic conditions and poor feeding.

A promising method of preventing the disease of birds with eimeriosis is immunoprophylaxis of this invasion. Many vaccines have been proposed to control avian eimeriosis, both injectable and live. Vaccines, depending on the epizootic situation on the farm, include pathogens that pose a major threat to birds. For the cultivation of chickens - *E. tenella*, *E. acervulina* and *E. maxima*, turkeys - *E. meleagrimitis* and *E. adenoides*. For repair young stock, laying hens and breeding herd - *E. nesatrix* and *E. brunetti*. When using live non-attenuated vaccines (Koktsivak, USA; coccidia culture VNIVIP, Russia; CKV, Russia, etc.), short-term addition of eimeriostatics to poultry feed should be used to prevent eimeriosis during immunity formation. The use of vaccines against attenuated pathogens (Livacox, Czech Republic; Paracox, Great Britain; Immucox, Canada) does not require the concomitant use of eimeriostatics. Clinically healthy chickens from 10 days of age are immunized. Immunity develops in two to three

weeks and is maintained through reinvasion by pathogens. However, it is known that immunity during eimeriosis is non-sterile (in the presence of the pathogen in the body of the bird) and species-specific (only to those types of pathogens that caused the infection). Immunity in chickens under conditions that will prevent re-infection, begins to weaken markedly in 45-50 days after "illness" or after immunization.

References

1. Богач М. В., Тараненко І.Л. Паразитарні хвороби індиків фермерських і присадибних господарств півдня України [Текст]. Аграрний вісник Причорномор'я: зб. наук. праць. Одеса, 2013. Вип. 21. С. 311–317.
2. Кожоков М. К., Алабов А. М. Иммунобиохимические показатели крови при ассоциативных болезнях птиц. Тр. Всерос. ин-т гельминтологии им. К. И. Скрябина, 2001. Т.37. С. 191–194.
3. Нагорна Л. В. Протозоози проти індиків. Наше птахівництво: для лікарів ветеринарної медицини, технологів птахопідприємств. 2014. N 1. С. 70–74.
4. Паразитологія та інвазійні хвороби тварин. Підручник В. Ф. Галат, А. В. Березовський, Н. М. Сорока, М. П. Прус – К.: Вища освіта, 2009. – 462 с.
5. Сейтумерова А. Р. Особенности эпизоотологии и клинического проявления эймериоза у кур. Мат. всеукр. наук.–практ. Інтернет – конференції. «Проблеми ветеринарної паразитології та якості і безпека продукції тваринництва», Полтава, 2014. С. 78 – 81.
6. Семенко О. В. Деякі особливості поширення та заходів боротьби з еймеріозом птиці. Сучасне птахівництво. 2014. № 8. С. 7–11.
7. Фотіна Т. І. Найпоширеніші хвороби індиків. Наше птахівництво: для лікарів ветеринарної медицини, технологів птахопідприємств. 2016. N 3. С. 88–90.
8. Williams R. B., Marshall R. N., Ragione R. M., Catchpole J. A new method for the experimental production of necrotic enteritis and its use for studies on the relationships between necrotic enteritis, coccidiosis and anticoccidial vaccination of chickens. *Parasitol.* 2013. Res.90. P. 19–26.

№51, 2021
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VOL.1

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