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Clinical symptoms, seasonal dynamics and diagnosis of eimeriosis

Eymeriozning klinik belgilari, mavsumiy dinamikasi va diagnostikasi

Клинические симптомы, сезонная динамика и диагностика эймериоза

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ENGLISH

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Abstract. This article presents the clinical signs of eimeriosis in farm animals, especially rabbits, the characteristics of the course of the disease, its outcomes and age-related data. The occurrence of the disease in rabbits by season, the results of observations on farms, the classical methods widely used for diagnosing the disease and the order of their implementation are described in sequence. In addition, guidance is given on identifying rabbits affected or unaffected by eimeriosis from their appearance, on taking anamnesis data and on performing palpation. The main information in the article was obtained by analysing literature sources and is presented in a consolidated form.

Keywords: eimeriosis; rabbit; oocyst; protozoa; schizogony; gametogony; sporogony; macrogamete; microgamete; flotation method; Fülleborn method

O‘ZBEKCHA

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Annotatsiya. Ushbu maqolada qishloq xo‘jaligi hayvonlarida, ayniqsa quyonlarda uchraydigan eymeriozlarning klinik belgilari, kasallikning kechish xususiyatlari, oqibatlari va yoshga bog‘liq ma’lumotlar keltirilgan. Quyonlarda kasallikning yil fasllariga qarab uchrash holati, xo‘jaliklardagi kuzatishlar natijalari, kasallikni aniqlashda keng qo‘llaniladigan klassik usullar va ularni bajarish tartibi ketma-ketlikda bayon qilingan. Bulardan tashqari, eymerioz bilan zararlangan yoki zararlanmagan quyonlarni tashqi ko‘rinishidan aniqlash, anamnez ma’lumotlarini olish va paypaslash usullarini bajarish bo‘yicha yo‘riqnomalar keltirilgan. Maqoladagi asosiy ma’lumotlar adabiyot manbalaridan tahlil qilib olingan va mujassamlashtirilgan holda taqdim etilgan.

Kalit so‘zlar: eymerioz; quyon; oosista; protozoa; shizogoniya; gametogoniya; sporogoniya; makrogameta; mikrogameta; flotatsiya usuli; Fyulleborn usuli

РУССКИЙ

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Аннотация. В данной статье представлены клинические признаки, особенности течения заболевания, последствия и возрастные данные по эймериозу у сельскохозяйственных животных, в частности у кроликов. Последовательно описаны заболеваемость кроликов по сезонам, результаты наблюдений на фермах, классические методы, широко используемые для диагностики заболевания, и порядок их применения. Кроме того, даны рекомендации по выявлению кроликов, инфицированных или не инфицированных эймериями, по внешнему виду, по сбору анамнеза и проведению пальпаторных методов. Основная информация статьи получена в результате анализа литературных источников и представлена в обобщённом виде.

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Ключевые слова: эймериоз; кролик; ооциста; простейшие; шизогония; гаметогония; спорогония; макрогамета; микрогамета; метод флотации; метод Фюллеборна

1. KIRISH
Introduction

Bugungi kunda dunyo aholisining chorvachilik mahsulotlariga, jumladan quyon go‘shti, undan tayyorlanadigan parhez oziq-ovqat, jun va teri xom ashyosiga bo‘lgan talabi yildan-yilga oshib bormoqda. Ushbu talabni qondirish, yangi ish o‘rinlarini yaratish va quyon go‘shti ishlab chiqarish hajmini yanada oshirish muhim vazifa hisoblanadi. Eymerioz bilan kasallangan quyonlarda davolash ishlari o‘z vaqtida olib borilmasa, 15–20 kun ichida quyonlarning 90 foizi nobud bo‘ladi. Shunga ko‘ra, turli hududlardagi quyonlarning invazion kasalliklarini aniqlash, davolash va oldini olish chora-tadbirlarini ishlab chiqish muhim ilmiy va amaliy ahamiyat kasb etadi.

2. MAVZUNING DOLZARBLIGI
Relevance of the topic

Barcha yoshdagi quyonlar eymeriyalar bilan zararlanadi. Ammo 3–4 oylikkacha bo‘lgan yosh quyonchalar kasallikka ko‘proq chalinadi; yoshi kattaroq va katta yoshli quyonlar kasallikka chidamliroq hisoblanadi. Kasallik 20 kunlikdan 60 kunlikkacha bo‘lgan quyonlarda og‘ir kechadi va o‘lim bilan tugaydi. Quyonlar tug‘ilishining birinchi kunidan boshlab alimentar (og‘iz orqali) yo‘l bilan doimiy ravishda eymeriya oosistalarini suv va oziqa bilan qo‘shib yuta boshlaydi; shu tariqa 3 oylikka yetganda quyonlarda invaziyaning ekstensivligi 100 % ga yetadi.

Quyon bolalarida eymerioz turli shakllarda namoyon bo‘ladi: yosh quyonlarda kasallik ko‘pincha yarim o‘tkir va o‘tkir shaklda, katta quyonlarda esa surunkali va yashirin holda rivojlanadi. Kasallik ichakda (37,2 %) va jigarda (60,6 %) uchrashi hamda yoz faslida keng tarqalishi aniqlangan. Shuningdek, bo‘g‘oz va emizikli quyonlar qolganlariga qaraganda kamroq darajada zararlanishi tadqiqotlar natijasida aniqlangan. Quyonlar asosan 4 oylikdan boshlab eymeriozga chidamli bo‘la boshlaydi; natijada kasallik quyonlarda uchrasa-da, uning oqibatidan nobud bo‘lish holatlari kamayadi. Quyonlarning yosh guruhlarida o‘tkazilgan tadqiqotlarda deyarli har bir quyon tezagida eymeriozning oosistalari qayd etilgan. Yosh hayvonlarda invaziya ekstensivligi 100 % ni tashkil qilishi hamda 120 kundan katta quyonlarda invaziya ekstensivligi 89,7 % gacha kamayishi aniqlangan.

3. ADABIYOTLAR TAHLILI
Literature review

3.1. Oosistalarning sporulyatsiyasi va mavsumiy dinamika

Yilning turli fasllarida quyonlarning eymeriya oosistalari bilan zararlanish darajasi ko‘p jihatdan ularning tashqi muhitda sporalanish davriga bog‘liq. Tashqi muhitda oosistalarning sporulyatsiyasi faqat harorat va namlikning ma’lum diapazonida sodir bo‘ladi. Olimlarning fikriga ko‘ra, 18–22 °C haroratda va to‘yingan namlikda oosistalarning sporulyatsiyasi ko‘p hollarda bir necha kun ichida tugaydi [1, 9, 18].

Bahorda harorat 5–15 °C da va nisbiy namlik 35–82 % bo‘lganda Eimeria magna va E. media oosistalari uchun qulay sharoit yaratilib, natijada 120 soatdan keyin sporalanish yakuniga yetadi; E. perforans ushbu qulay sharoitda 59 soatda sporalanishini yakunlaydi. Yozda 15–26 °C haroratda va nisbiy namlik 30–90 % bo‘lganda E. irresidua oosistalari 54 soatdan so‘ng, E. magna 54–72 soatda, E. media 54–60 soatda, E. perforans 30–36 soatda sporalanishi aniqlangan [14]. Qishda 1–30 °C haroratda deyarli barcha quyon eymeriya oosistalari sporalanmasligi, shuningdek 30 kun ichida nobud bo‘lmasligi qayd etilgan. Kasallik deyarli barcha quyonchilik fermalarida yilning barcha fasllarida uchraydi. Oosistalarning tashqi muhitda sporulyatsiya davri 24 soat davom etganligi sababli, ushbu davrdan keyin quyon najasidagi oosistalar yuqumli hisoblanadi [4].

Quyonchilik xo‘jaliklarida kasallikning avj olishi ko‘proq issiq mavsumda kuzatiladi, ammo quyonxona issiq bo‘lsa, kasallik qishda ham paydo bo‘lishi mumkin. Quyon eymeriozi yil davomida yoz faslida hamda qishda 1 oylikdan 3 oylikkacha bo‘lgan quyonlarda eng ko‘p uchraydi. Tadqiqotlarga ko‘ra, yozda iyundan avgustgacha katta yoshli quyonlarda invaziyaning ekstensivligi 100 %, qishda invaziyaning intensivligi 67 % ekanligi aniqlangan. Qishda invaziya kamroq uchragani bilan quyonlar kasallikni og‘ir o‘tkazadi, natijada o‘lim holatlari yuz beradi [2, 3, 12].

3.2. Qo‘zg‘atuvchining morfologiyasi va rivojlanish davrlari

Quyon eymeriya oosistalarining uzunligi 12 mkm dan 35 mkm gacha yetadi. Har bir oosistada 4 tadan sporoblast (sporosista) bor. Har qaysi sporosista ichida esa 2 tadan ingichka, chuvalchangsimon, harakatchan sporozoit bo‘ladi. Oziqa yoki suv bilan ichakka tushgan oosistalar va sporosistalar qobig‘i yemirilib, sporosistalar ichak bo‘shlig‘iga chiqadi va ulardan sporozoitlar ajraladi. Sporozoitlar faol harakatlanib ichak, jigar va oshqozon osti bezi hujayralariga kirib oladi hamda oziqlanib o‘suvchi davrga — trofozoitlarga aylanadi. Trofozoitlar tez o‘sadi, yadrosi ko‘p marta ketma-ket bo‘linib, ko‘p yadroli shizontlarni hosil qiladi. O‘z navbatida shizont ham bo‘linib, ko‘p sonli merozoitlarni hosil qiladi [10].

Barcha sporalilar qaysi yo‘l bilan rivojlanmasin, uchta taraqqiyot davrini boshdan kechiradi. Birinchi faza — sporogoniya bosqichi bo‘lib, u tashqi muhitda amalga oshadi; bu fazada oosistalar sporosistaga aylanadi va shundan keyingina invazion holatga o‘tadi. Ikkinchi faza — shizogoniya: bu fazada sporosistalardan sporozoitlar hosil bo‘ladi va ular quyonlarning jigar hamda ichak epitelial hujayralariga kiradi, u yerda bo‘linish yo‘li bilan merozoitlar va shizontlar hosil bo‘ladi. Shizontlardan yetilgan parazitlardan makrogametalar (urg‘ochi hujayralar) va mikrogametalar (erkak hujayralar) shakllanadi. Uchinchi faza — gametogoniya: bu fazada ko‘payish jinsiy yo‘l bilan amalga oshadi, mikrogameta ichak yo‘liga yoki o‘t yo‘liga chiqadi va makrogameta ichiga kirib uni otalantiradi. Shu yo‘l bilan oosista hosil bo‘ladi va oosistalar najas bilan tashqi muhitga ajraladi. Oosistalar tashqi muhitning noqulay ta’sirlariga chidamli, lekin yuqori haroratga chidamsiz: 80–100 °C da 5–10 soniyada, 55 °C da esa 15 daqiqada nobud bo‘ladi [21].

3.3. Diagnostika usullari

Eymeriozning diagnostikasi epizootologik ma’lumotlar, klinik belgilar, ichakdagi patologik o‘zgarishlar hamda kasallik aralash holda uchraganda jigardagi o‘zgarishlar hisobga olingan holda amalga oshiriladi [15].

Kasallikka diagnoz qo‘yishda hayvonlarning najasida oosistalarni topish, nobud bo‘lgan hayvon ichagining shilliq qavati bo‘laklarini o‘rganish va mikroskopda sinchiklab ko‘rib eymeriyalarni topish eng qulay usul ekanligi taklif qilingan. Bu usul yordamida ichak epiteliy hujayralarida eymeriyalarning merozoitlari va shizontlari topiladi [7, 24].

Diagnoz qo‘yishda mahalliy smear usuli qo‘llaniladi. Bu diagnostikaning eng oddiy usuli bo‘lib, najas surtilgan slaydga glitserin va natriy xloridning to‘yingan eritmasi teng qismlaridan iborat

suyuqlikdan 2–3 tomchi qo‘shiladi va smear mikroskop ostida tekshiriladi; ushbu usulda ham eymeriya oosistalarini topish mumkin [8].

Eymerioz diagnostikasi uchun flotatsiya usullari ham tavsiya etiladi. Ushbu usullar eymeriya oosistalarini turli tuzlarning to‘yingan eritmasi yordamida aniqlashga asoslangan. Eymeriozni tashxislash uchun flotatsiya usullaridan eng keng qo‘llaniladiganlari Fyulleborn, Darling va Brez usullari bo‘lib, ular kasallikni aniqlashda oddiy, arzon va samarali ekanligi qayd etilgan [20].

Darling va Brez usullari najas namunalarini qayta ishlashning qarama-qarshi usullari — cho‘ktirish va flotatsiya kombinatsiyasiga asoslangan. Buning mohiyati shundaki, najas namunasini qayta ishlashning murakkabligiga qaramay, tadqiqot uchun flotatsiya eritmasi kamroq sarflanadi, usullar tejamkorroq va natijalari samaraliroq bo‘ladi. Brez flotatsiya usulida flotatsion suyuqlik magniy sulfat, natriy tiosulfat, bir qism suv va to‘yingan eritmalarning uch qismidan tashkil topgan kombinatsiyalangan eritma hisoblanadi [25].

Qarama-qarshi usullarning bu kombinatsiyasi tufayli cho‘kindi va sirt plyonkasi eymeriya oosistalari bilan boyitiladi, suspenziyaning ortiqcha begona zarralari chiqarib tashlanadi va mikroskopiyaga xalaqit bermaydi. Suspenziyani ikki marta — avval suv bilan, so‘ngra flotatsiya eritmasi bilan sentrifugalash birinchi bosqichda markazdan qochma kuch ta’sirida oosistalarning tez cho‘kishiga, ikkinchisida esa ularning suzib chiqishiga yordam beradi [17].

Kombinatsiyalangan flotatsiya eritmasidan tashqari olimlar Goryaev kamerasi yoki Makmaster kamerasi yordamida najasdagi oosistalar sonini aniqlash usulini ham taklif qilishadi [16, 22].

Quyonlarga eymerioz tashxisini qo‘yishda sentrifugalash bilan modifikatsiyalangan Fyulleborn usulidan foydalanish klassik Fyulleborn usulidan 4,9–19,2 marta va standartlashtirilgan Darling usulidan 1,1–1,8 marta samaraliroq ekani hamda har bir namunada 3 dan 35 daqiqagacha vaqt tejash mumkinligi isbotlangan. To‘yingan natriy xlorid eritmasi o‘rniga to‘yingan natriy tiosulfat eritmasidan foydalanish modifikatsiyalangan Fyulleborn usulining samaradorligini 1,34 martaga oshiradi [5, 13, 26].

3.4. Klinik belgilar va immunitet

Ushbu kasallikni tashxislashda eymeriozning klinik belgilari ham muhim rol o‘ynaydi. Quyonning o‘ng tomoni paypaslab ko‘rilganda jigar og‘rig‘iga, ko‘rinarli shilliq qavatning kamqonligiga va jigar shikastlanishi bilan kuzatiladigan sariqlikka, qorin hajmining kattalashishiga, quyonlarda diareya, poliuriya va ozg‘inlikka alohida e’tibor berilishi kerak. Ammo ichak va jigar shaklidagi quyon eymeriozining klinik belgilarini o‘ziga xos bo‘lmagan deb hisoblash mumkin. Ushbu kasallikning eng ishonchli diagnostik mezoni laboratoriya diagnostikasi usullari va patologik o‘zgarishlar hisoblanadi [6, 19].

Kasallikdan sog‘aygan quyonlarda nosteril immunitet paydo bo‘ladi. Bu immunitet quyonlar hayoti davomida saqlanib qoladi. Immunitet faqat maxsus, ya’ni kasallikni qo‘zg‘atgan eymeriya turigagina xos bo‘ladi; boshqa turning oosistalari quyon organizmiga tushganda kasallik rivojlanaveradi [11, 23].

Kasallikni diagnostika qilishda quyonlar qornining shishib ketishi, tez-tez siyishi, ichi ketishi va patologoanatomik o‘zgarishlariga qarab xulosa chiqariladi. Aniq diagnoz qo‘yish uchun kasallangan quyonning tezagi Fyulleborn usulida tekshirilib, oosistalarning bor yoki yo‘qligi mikroskop ostida aniqlanadi [27].

4. XULOSA

Conclusion

Yuqorida keltirilgan ma’lumotlar bizgacha protozoolog olimlar tomonidan eymeriyalarni o‘rganish natijalarining tahlili bo‘lib, klassik ma’lumot sifatida bugungi fan-texnika rivojlangan davrda ham o‘z dolzarbligini yo‘qotmagan. Respublikamizda quyonchilik rivojlanishning dastlabki bosqichida ekanligini hisobga olsak, ushbu sohada iqtisodiy samaradorlikni oshirish uchun mazkur kasallikni tadbirkorlar va yosh mutaxassislar chuqur bilishlari shart, chunki eymerioz quyonlarning eng keng tarqalgan besh kasalligi sirasiga kiradi.

Adabiyotlar tahlili xulosasiga ko‘ra, eymerioz barcha tur hayvonlarda uchraydi va quyonchilik hamda parrandachilik sohalariga jiddiy xavf tug‘diradi. Kasallik asosan yosh hayvonlarda og‘ir kechadi; yoshi katta hayvonlar kasallikka chidamli bo‘lib, ular kasallik manbayi sifatida xizmat qiladi. Kasallik yilning barcha fasllarida uchraydi va ayniqsa bahor hamda yoz fasllarida xo‘jaliklarga katta iqtisodiy zarar yetkazadi.

DECLARATIONS

Declarations

Author contributions *CRediT*

Conceptualization; Methodology; Investigation; Data curation; Writing – original draft; Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

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Ethics approval

The article is a review of published scientific literature. The work involved no experiments on animals and no human participants, and therefore required no separate ethics committee approval.

Informed consent

All authors have read and approved the final version of the manuscript and have given their consent to its submission and publication. The study involved no human participants and no personal data.

Data availability statement

All data discussed in this review are taken from the publications listed in the reference list and are available from those sources.

Conflict of interest

The authors declare no conflict of interest.

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Generative AI disclosure

Generative AI was used only partially. The authors used Claude (Anthropic, Opus 5) for language editing, formatting of the reference list and preparation of the English and Russian metadata. No text, data, figures or conclusions were generated by AI. The authors reviewed and verified all output and take full responsibility for the content of the publication.

EXTENDED SUMMARY IN ENGLISH

Kengaytirilgan inglizcha xulosa / Расширенный реферат на английском языке

Purpose and research problem

Demand for rabbit products — meat, dietary foods made from it, wool and hides — is rising year by year, and increasing the volume of rabbit meat production is an important task for the livestock sector of Uzbekistan. Eimeriosis is one of the five most common diseases of rabbits: if treatment is not carried out in time, up to 90 per cent of affected rabbits die within 15–20 days. Rabbits of all ages become infected with Eimeria, but young rabbits up to three or four months of age are affected most severely; the disease is most acute in animals between twenty and sixty days old and frequently ends in death. From the first day of life rabbits continuously ingest oocysts with water and feed by the alimentary route, so that by three months of age the prevalence of invasion reaches 100 per cent. In young rabbits the disease usually takes a subacute or acute form, whereas in adults it becomes chronic and latent; it is recorded in the intestine in 37.2 per cent and in the liver in 60.6 per cent of cases, and is most widespread in summer. Rabbits begin to acquire resistance from about four months of age, after which the disease still occurs but mortality falls; in animals older than 120 days the prevalence of invasion declines to 89.7 per cent. The purpose of this article is to consolidate and analyse the published data on the clinical signs,

the seasonal dynamics and the diagnostic methods of rabbit eimeriosis, and to present them as a practical reference for specialists and farmers in a sector that is still at an early stage of development in Uzbekistan.

Materials and methods

The article is a literature review. Twenty-seven sources were analysed, comprising international journal papers on the biology and immunology of Eimeria, classical monographs and manuals on the diagnosis of coccidiosis, and regional publications on the epizootiology of rabbit eimeriosis in Uzbekistan. For each source the review extracted data on three groups of questions: the morphology of the oocysts and the developmental cycle of the parasite; the environmental conditions — temperature and relative humidity — governing sporulation and hence the seasonal pattern of infection; and the laboratory procedures used for diagnosis, together with the reported comparative efficiency of those procedures. The diagnostic techniques considered were direct smear microscopy, the flotation methods of Fülleborn, Darling and Breza, the combined sedimentation-and-flotation approach with double centrifugation, and quantitative counting of oocysts in the Goryaev and McMaster chambers. Clinical criteria — palpation of the right side for hepatic pain, pallor of the visible mucous membranes, icterus, enlargement of the abdomen, diarrhoea, polyuria and emaciation — were assessed for their diagnostic value against laboratory findings. No original experiment was conducted; the data are presented in consolidated form.

Results and discussion

The degree of infection of rabbits with Eimeria oocysts in different seasons depends largely on the sporulation period in the environment, and sporulation occurs only within defined ranges of temperature and humidity. At 18–22 °C and saturated humidity sporulation is generally completed within a few days. In spring, at 5–15 °C and a relative humidity of 35–82 per cent, favourable conditions arise for the oocysts of Eimeria magna and E. media, whose sporulation is completed after 120 hours, while E. perforans completes sporulation in 59 hours. In summer, at 15–26 °C and a relative humidity of 30–90 per cent, the oocysts of E. irresidua sporulate after 54 hours, E. magna in 54–72 hours, E. media in 54–60 hours and E. perforans in 30–36 hours. In winter, at temperatures around 1–30 °C, almost no rabbit Eimeria oocysts sporulate, yet they also do not perish within thirty days. Because the sporulation period in the environment lasts twenty-four hours, oocysts in rabbit faeces are considered infective after that interval. Outbreaks occur mainly in the warm season, but if the rabbitry is heated the disease may also appear in winter; it is most frequent in summer and, in winter, in rabbits between one and three months old. In summer, from June to August, the prevalence of invasion in adult rabbits reaches 100 per cent, whereas in winter the intensity of invasion is 67 per cent; although invasion is less frequent in winter, the disease runs a more severe course and mortality occurs. Oocysts are 12–35 μm long and each contains four sporoblasts, every sporocyst holding two motile, thread-like sporozoites. After the shells are destroyed in the intestine the sporozoites penetrate the cells of the intestine, liver and pancreas, become trophozoites, and through repeated nuclear division form multinucleate schizonts and then numerous merozoites. Development proceeds through three phases: sporogony in the external environment, by which oocysts become infective; schizogony in the epithelial cells of the liver and intestine; and gametogony, in which the microgamete fertilizes the macrogamete and the resulting oocysts are shed with the faeces. Oocysts resist adverse environmental factors but are killed by heat — within 5–10 seconds at 80–100 °C and within 15 minutes at 55 °C. Diagnosis rests on epizootiological data, clinical signs and pathological changes together with laboratory confirmation. The simplest procedure is the native smear with glycerol and saturated sodium chloride; among flotation methods those of Fülleborn, Darling and Breza are the most widely used and are simple, cheap and effective. The combined sedimentation-and-flotation approach enriches both the sediment and the surface film with oocysts while removing interfering particles, and double centrifugation — first with water, then with flotation fluid — first accelerates sedimentation and then flotation. The Fülleborn method modified by centrifugation proved 4.9–19.2 times more effective than the classical Fülleborn method and 1.1–1.8 times more effective than the standardized Darling method, saving between three and thirty-five minutes per sample; replacing saturated sodium chloride with saturated sodium thiosulphate increased its efficiency a further 1.34-fold. Clinical signs — hepatic pain on palpation of the right side, anaemia of the visible mucosae, icterus, abdominal enlargement, diarrhoea, polyuria and emaciation — are informative but not specific, so laboratory methods and pathological findings remain the most reliable criteria. Recovered rabbits develop non-sterile, species-specific immunity that persists for life, but oocysts of a different Eimeria species will still cause disease.

Conclusion and contribution

The data summarized here represent the analysis of results obtained by protozoologists over many decades; as classical knowledge they have not lost their relevance in the present age of advanced science and technology. Given that rabbit farming in Uzbekistan is still at an early stage of development, a thorough understanding of this disease by entrepreneurs and young specialists is essential for raising the economic efficiency of the sector, since eimeriosis ranks among the five most important diseases of rabbits. Eimeriosis occurs in all animal species and poses a serious threat to rabbit and poultry farming; it runs a severe course mainly in young animals, while older animals are resistant and serve as a source of infection. The disease is recorded in all seasons of the year and causes particularly heavy economic losses to farms in spring and summer. The contribution of this review lies in bringing the morphological, epizootiological, clinical and laboratory aspects of rabbit eimeriosis together in a single practical reference and in identifying the modified Fülleborn method with centrifugation, using saturated sodium thiosulphate, as the most efficient diagnostic procedure currently available for farm conditions.

ADABIYOTLAR RO‘YXATI

References (original language)

[1] Augustine P., Danforth H.D., McAndrew S.J. Monoclonal antibodies reveal antigenic differences in retractile bodies in avian Eimeria sporozoites. Journal of Parasitology, 1988, vol. 74, no. 4, pp. 653–659.

[2] Axmadaliyev N.T., Xushnazarov A.X., Davlatov R.B. Farg‘ona viloyatining ayrim tumanlarida quyon eymeriozining diagnostikasi va epizootik holati. Ta’lim, fan va innovatsion g‘oyalar dunyoda, 2024, t. 44, № 3, b. 23–29.

[3] Akhmadaliyev N.T., Khushnazarov A.Kh., Davlatov R.B. Diagnostics and epizootic status of rabbit eimeriosis in certain districts of Fergana region. Western European Journal of Modern Experiments and Scientific Methods, 2024, vol. 2, no. 4, pp. 56–62.

[4] Bach M., Bach J. International Journal of Immunopharmacology, 1983, no. 3, pp. 274–296.

[5] Davlatov R.B., Khushnazarov A.K. Diagnosis and chemoprophylaxis of rabbit eimeriosis. E3S Web of Conferences, EDP Sciences, 2024, vol. 480, art. 03020.

[6] Danforth H.D. Use of monoclonal antibodies directed against Eimeria tenella sporozoites to determine stage specificity and in vitro effect on parasite penetration and development. American Journal of Veterinary Research, 1983, vol. 44, no. 9, p. 44.

[7] Drouet-Viard F. 6th World Rabbit Congress, Toulouse, 1996, pp. 15–19.

[8] Gringoli G., Quessada A., Coppola C. Diffusione dei coccidi negli allevamenti cunicoli campani. Proceedings of the Zoological Society of Calcutta, 1987, p. 16.

[9] Huang Luyi, Chen Hua. Inhibitory effect of chemicals on the development of rabbit coccidial oocysts. Journal of Fujian Agricultural College, 1990, no. 19, pp. 71–76.

[10] John N.V., Zea M.E.R., Kawano T., Omata Y., Saito A., Toyda Y., Mikami T. Identification of carbohydrates on Eimeria stiedae sporozoites and their role in the invasion of cultured cells in vitro. Veterinary Parasitology, 1999, vol. 81, no. 2, pp. 99–105.

[11] Katiyar S.K., Gordon V.R., McLaughlin G.L., Edlind T.D. Antiprotozoal activities of benzimidazoles and correlations with beta-tubulin sequence. Antimicrobial Agents and Chemotherapy, 1994, vol. 38, no. 9, pp. 2086–2090.

[12] Khushnazarov A., Davlatov R. Quyon eymeriozini davolashda yangi eymeriostatikning samaradorligi. Library, 2022, t. 22, № 1, b. 28–29.

[13] Khushnazarov A., Davlatov R., Khujakhonov S. Diagnostics and seasonal dynamics of eimeriosis in rabbit breeds kept in Uzbekistan. BIO Web of Conferences, EDP Sciences, 2026, vol. 238, art. 01007.

[14] Kintzel P., Hasslinger M.-A. Wirksamkeit und Verträglichkeit von Robenidine und Diclazuril bei der Bekämpfung der Kokzidien des Kaninchens. Praktischer Tierarzt, 1995, Jg. 76, no. 3, pp. 250–256.

[15] Lajac A.M. The role of gastrointestinal immunity in parasitic infections of small animals. Seminars in Veterinary Medicine and Surgery (Small Animal), 1987, no. 2, p. 4.

[16] Meshkov S.N. Проучванне на кокцидиозата при домашните зайци. Veterinarna Sbirka (Bulgaria), 1982, vol. 80, no. 1, pp. 24–25.

[17] Nayak D.C., Rai P. Serum protein profiles in experimental coccidiosis in chicken. Journal of the Indian Veterinary Association, 1986, no. 2, p. 63.

[18] Niedzwiadek S. Kokcydioza a zagospodarowania nawozu krolicze go. Hodowca Drobnego Inwentarza, 1989, no. 37(7/8), pp. 17–18.

[19] Ramisz A. Profilaktyka i zwalczanie kokcydiozy u zwierząt. Wiadomości Parazytologiczne, 1989, no. 34, pp. 551–555.

[20] Rose M.E. Immunity to Eimeria infections. Veterinary Immunology and Immunopathology, 1987, no. 17, pp. 333–343.

[21] Sambeth W.H. Salinomycin for prevention of coccidiosis in rabbits. Proceedings of the 2nd World Rabbit Congress, Barcelona, 1980, vol. 2, pp. 293–296.

[22] Tsunoda K. Eimeria matsubayashii sp. nov., a new species of rabbit coccidium. Experimental Reports of the Government Experimental Animal Hygiene Station, Tokyo, 1952, p. 25.

[23] Wisher M.H. Identification of the sporozoite antigens of Eimeria tenella. Molecular and Biochemical Parasitology, 1986, vol. 21, no. 1, pp. 7–15.

[24] Хушназаров А., Давлатов Р. Эпизоотология эймерий кроликов, лечение и меры профилактики. Library, 2024, т. 1, № 1, с. 181–184.

[25] Хушназаров А. История и систематическое состояние изучения эймериоза кроликов (обзор литературы). Library, 2023, т. 1, № 2, с. 16–19.

[26] Хушназаров А., Ахмадалиев Н., Давлатов Р. Эпизоотология эймериоза кроликов. Library, 2023, т. 1, № 2, с. 94–99.

[27] Xushnazarov A.X., Djurayev O.A. Quyonlar eymeriozining patologoanatomik tekshirilishi. Yangi O‘zbekiston ustozlari, 2024, t. 2, № 29, b. 294–301.

REFERENCES (ROMAN SCRIPT)

Transliterated list — required by Scopus and Web of Science

[1] Augustine P., Danforth H.D., McAndrew S.J. Monoclonal antibodies reveal antigenic differences in retractile bodies in avian Eimeria sporozoites. Journal of Parasitology, 1988, vol. 74, no. 4, pp. 653–659.

[2] Akhmadaliyev N.T., Khushnazarov A.Kh., Davlatov R.B. Farg‘ona viloyatining ayrim tumanlarida quyon eymeriozining diagnostikasi va epizootik holati [Diagnostics and epizootic status of rabbit eimeriosis in certain districts of Fergana region]. Ta’lim, fan va innovatsion g‘oyalar dunyoda, 2024, vol. 44, no. 3, pp. 23–29. (in Uzbek)

[3] Akhmadaliyev N.T., Khushnazarov A.Kh., Davlatov R.B. Diagnostics and epizootic status of rabbit eimeriosis in certain districts of Fergana region. Western European Journal of Modern Experiments and Scientific Methods, 2024, vol. 2, no. 4, pp. 56–62.

[4] Bach M., Bach J. International Journal of Immunopharmacology, 1983, no. 3, pp. 274–296.

[5] Davlatov R.B., Khushnazarov A.K. Diagnosis and chemoprophylaxis of rabbit eimeriosis. E3S Web of Conferences, EDP Sciences, 2024, vol. 480, art. 03020.

[6] Danforth H.D. Use of monoclonal antibodies directed against Eimeria tenella sporozoites to determine stage specificity and in vitro effect on parasite penetration and development. American Journal of Veterinary Research, 1983, vol. 44, no. 9, p. 44.

[7] Drouet-Viard F. 6th World Rabbit Congress, Toulouse, 1996, pp. 15–19.

[8] Gringoli G., Quessada A., Coppola C. Diffusione dei coccidi negli allevamenti cunicoli campani. Proceedings of the Zoological Society of Calcutta, 1987, p. 16.

[9] Huang Luyi, Chen Hua. Inhibitory effect of chemicals on the development of rabbit coccidial oocysts. Journal of Fujian Agricultural College, 1990, no. 19, pp. 71–76.

[10] John N.V., Zea M.E.R., Kawano T., Omata Y., Saito A., Toyda Y., Mikami T. Identification of carbohydrates on Eimeria stiedae sporozoites and their role in the invasion of cultured cells in vitro. Veterinary Parasitology, 1999, vol. 81, no. 2, pp. 99–105.

[11] Katiyar S.K., Gordon V.R., McLaughlin G.L., Edlind T.D. Antiprotozoal activities of benzimidazoles and correlations with beta-tubulin sequence. Antimicrobial Agents and Chemotherapy, 1994, vol. 38, no. 9, pp. 2086–2090.

[12] Khushnazarov A., Davlatov R. Quyon eymeriozini davolashda yangi eymeriostatikning samaradorligi [Efficacy of a new eimeriostatic in the treatment of rabbit eimeriosis]. Library, 2022, vol. 22, no. 1, pp. 28–29. (in Uzbek)

[13] Khushnazarov A., Davlatov R., Khujakhonov S. Diagnostics and seasonal dynamics of eimeriosis in rabbit breeds kept in Uzbekistan. BIO Web of Conferences, EDP Sciences, 2026, vol. 238, art. 01007.

[14] Kintzel P., Hasslinger M.-A. Wirksamkeit und Verträglichkeit von Robenidine und Diclazuril bei der Bekämpfung der Kokzidien des Kaninchens. Praktischer Tierarzt, 1995, vol. 76, no. 3, pp. 250–256.

[15] Lajac A.M. The role of gastrointestinal immunity in parasitic infections of small animals. Seminars in Veterinary Medicine and Surgery (Small Animal), 1987, no. 2, p. 4.

[16] Meshkov S.N. Prouchvane na koktsidiozata pri domashnite zaytsi [Study of coccidiosis in domestic rabbits]. Veterinarna Sbirka, 1982, vol. 80, no. 1, pp. 24–25. (in Bulgarian)

[17] Nayak D.C., Rai P. Serum protein profiles in experimental coccidiosis in chicken. Journal of the Indian Veterinary Association, 1986, no. 2, p. 63.

[18] Niedzwiadek S. Kokcydioza a zagospodarowania nawozu kroliczego. Hodowca Drobnego Inwentarza, 1989, no. 37(7/8), pp. 17–18. (in Polish)

[19] Ramisz A. Profilaktyka i zwalczanie kokcydiozy u zwierząt. Wiadomości Parazytologiczne, 1989, no. 34, pp. 551–555. (in Polish)

[20] Rose M.E. Immunity to Eimeria infections. Veterinary Immunology and Immunopathology, 1987, no. 17, pp. 333–343.

[21] Sambeth W.H. Salinomycin for prevention of coccidiosis in rabbits. Proceedings of the 2nd World Rabbit Congress, Barcelona, 1980, vol. 2, pp. 293–296.

[22] Tsunoda K. Eimeria matsubayashii sp. nov., a new species of rabbit coccidium. Experimental Reports of the Government Experimental Animal Hygiene Station, Tokyo, 1952, p. 25.

[23] Wisher M.H. Identification of the sporozoite antigens of Eimeria tenella. Molecular and Biochemical Parasitology, 1986, vol. 21, no. 1, pp. 7–15.

[24] Khushnazarov A., Davlatov R. Epizootologiya eymeriy krolikov, lechenie i mery profilaktiki [Epizootiology of rabbit Eimeria, treatment and preventive measures]. Library, 2024, vol. 1, no. 1, pp. 181–184. (in Russian)

[25] Khushnazarov A. Istoriya i sistematicheskoe sostoyanie izucheniya eymerioza krolikov (obzor literatury) [History and systematic status of the study of rabbit eimeriosis (a review)]. Library, 2023, vol. 1, no. 2, pp. 16–19. (in Russian)

[26] Khushnazarov A., Akhmadaliev N., Davlatov R. Epizootologiya eymerioza krolikov [Epizootiology of rabbit eimeriosis]. Library, 2023, vol. 1, no. 2, pp. 94–99. (in Russian)

[27] Khushnazarov A.Kh., Djurayev O.A. Quyonlar eymeriozining patologoanatomik tekshirilishi [Pathoanatomical examination of rabbit eimeriosis]. Yangi O‘zbekiston ustozlari, 2024, vol. 2, no. 29, pp. 294–301. (in Uzbek)