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HISTORY AND SYSTEMATIC STATUS OF THE STUDY OF RABBIT EYMEROSIS

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Abstract:
In this article, the history of the study of eimeria in rabbits and the scientific research works of scientists who have been active in the promotion of this disease have been analyzed, focusing on some of the oocysts that cause the disease, giving detailed information about them.

Keyword
Eimeriosis, rabbit, Protozoa, Apicomplexa, Sporozoa, Coccidiida, Eimeriidae, Eimerinae, Eimeria, oosista, E.stiedae, E.perforans, E.media, E. magna, E.irresidua.

Introduction

Eimeria is an invasive disease that occurs in horses, cattle, sheep, goats, rabbits, pigs, wild mammals, birds, poultry, fish and other animals. The causative agents of this disease are spores belonging to the animal world Protozoa , phylum Apicomplexa , class Sporozoa , order Coccidiida , family Eimeriidae , subfamily Eimerinae and genus Eimeria . Each different animal has its own special (specific) eimeria, and they are mainly representatives of the eimeria family. Eimeria are parasites of epithelial cells. They parasitize the inner mucous membrane of intestines, liver and kidneys. Eymeriosis is widespread in all countries, and the disease causes great economic damage to farms specializing in livestock, especially poultry and rabbit breeding, 85-90 percent of infected animals die.

Eimeria develop mainly without the presence of an intermediate host. Only some species change hosts , and reproduce by schizogony in one host and gametogonia in the other host. Eimeria first invade the epithelial cells of animals and reproduce asexually, i.e. schizogany. Then it reproduces by gametogonia, forming a gamete. Oocysts enter the external environment through the feces of an animal infected with eimeria, and if there are favorable conditions, they continue their development and form spores through sporogonia. Animals are infected with the causative agent of eimeria by eating oocysts with sporozoites mixed with food and water through the mouth.

LITERATURE ANALYSIS AND METHODOLOGY

For the first time in 1839, Eimeria was found in the bile ducts of rabbits by T. Hake, but he assumed that it was a grain of pus. After that, in 1845, R. Remak found oocysts in the mucous membrane of the intestines of rabbits and added them to the genus Psorospermium

. called oviforme . K. Lindemann in 1965 recommended giving the name Eimeria (Monocystis) stiedae to rabbit liver eimeria . R. Leucart found intestinal Eimeria in rabbits in 1879 and called it Eimeria (Coccidium) perforans . In 1925, E. Perard found large intestinal Eymeria in rabbits, determined that they are morphologically different from E. perforans and named them E. magna . In America, in 1929 IFKessel found oocysts of oval size 26-36x15-22 µm found in rabbits and named them E. media . After that, IFKessel and M. Jankiewicz in 1931 found large egg-shaped eimeria in rabbits and named them E. irresidua . In 1934, in Hungary, A. Kotlan and L. Pospesch found pear-shaped 26-32x17-21 µm oocysts in rabbits and named them E. piriformis . In the same year, in the CIS, V.L. Yakimov found spherical and ovoid oocysts 10-18x9-16 µm in size and named them E.exigua , but in 1967, E.M. Heisin considered this species a synonym of E.perforans , and V.L. .Yakimov's opinion is not taken into account.

In America, in 1942, JCM Carvalho isolated cylindrical micropyles of 32.8-44.3x16.7-22.8 µm size belonging to Sylvilagus floridanus mearnsi from wild rabbits and named them E. neoleporis . 1944 infects the domestic rabbit with this species. In 1948, E.M. Heisin wrote information about 2 new species - E.coecicola and E.intestinalis , as a result of his long-term studies of the endogenous stage of the disease in rabbits.

In 1952, K. Tsunoda, conducting research on rabbits in Japan, found 24.8x18.2 µm wide oval-shaped oocysts and micropyles and named them E. matsubayashii . BSGill and HNRay described the new species E.nagpurensis in 1960. In 1965, HNRay and DCBanks together with 28-46x14-23 µm oval-sized oocyst micropyle in India and named it E. oryctolagi . Today, mainly 8 types of eimeria parasitize in the intestines of rabbits, but only 1 type of eimeria lives in the bile ducts of the liver.

RESEARCH METHODS AND RESULTS

Today, mainly 5 types of Eymeria are found in rabbit farms of our Republic and in the care of the population **:** E.stiedae, E.perforans, E.media, E. magna, E.irresidua.

The results of some of the works of scientists who studied scientific sources and historical information about these types of eimeria, conducted important scientific researches in their time and created historical innovations related to the field are considered necessary (classical) information for modern science.

Eimeria stiedae (Lindemann, 1865 & Kisskalt et Hartmann, 1907) - Oocysts are oval in size, yellow-gray in color. The shell has 2 contours, is smooth, 0.75 µm thick, and the constricted (narrowed) part of the oocyst has a micropyle, 6-10 µm wide. The size of oocysts is 30-40x16-25, on average 37.5-21.5 µm. In the newly hatched oocyst, the cytoplasm remains from the oocyst wall and forms a spherical shape. The sporulation process lasts 3-4 days. When the oocysts are fully mature, 4 elongated oval or pear-shaped oocysts measuring 14-18x10 µm are formed. A residual body in the form of a small colored granule is located between the spores. In the spore, 2 pear-shaped vestigial bodies, 8 µm long and 6 µm wide, are formed.

Endogenous development. In 1936, according to the information of C. Kotlan and L. Oellerdy, the period of endogenous development occurs in the epithelial tissues of the bile ducts of the liver. 5-6 days after infection, 10-15 µm-sized schizonts can be found, which harbor large merozoites. In addition, scientists also find other types of schizonts, in which a large number of merozoites, measuring 5-18x1-2 mm, are formed. A large number of hamonium cells were detected on the 16th day after infection. Microgametocides 20-25 µm in size are present with a large number of residual bodies. Prepatent duration is 16-17 days.

Eimeria perforans (Leuckart, 1879 & Sluiter et Swellengrebel, 1912) - Oocysts are elliptical or round in size. The bark is 2 contoured, smooth. Large oocysts have clearly visible micropyles, thickened on one side of the outer shell. In small oocysts, micropyles are not known in some cases. Oocysts are colorless, 13.3-30.6x10.3-17.3, 15.3 µm on average. In the newly hatched oocyst, the cytoplasm remains from the oocyst wall and forms a spherical shape. The sporulation process takes 1-3 days. After the process of sporulation of oocysts, 4 spores of oblong-oval size 8-9x4.5 µm and residual body 1.3-5.3 in diameter, average size of 2.4-4.3 µm are formed. The spore contains 2 comma-shaped sporazo i t and the residual body is 1-1.5 µm in size.

Endogenous development. According to the results of E.M. Heisin 's 1967 research , all stages of development take place in the epithelial tissue ducts, and the small intestine is located in the middle part. The first generation of schizonts develops in the size of 13-14 µm on the 3-4th day of damage. These harbor 50-120 merozoites, measuring 7-9 µm in length and 0.5-0.7 µm in width. In addition, there are cases where merozoites with a size of 4-5x1 µm, which are not as large as 5-10 µm, are kept. Microgametocides are 12-14 µm in size. The prepatent process takes 5-6 days .

Eimeria media (Kessel , 1929) - Oocysts are oval and elliptical in size. One end of the oocyst is partially thickened. Micropyles are well defined and less swollen. The outer shell of the oocyst is thickened around the micropyle. But the appearance of E. like magna . The outer shell of the oocyst is pale yellow or light gray in color. Oocysts are 18.6-33.3x13.3-21.3 µm in size. The sporulation period is 2-3 days. Sporulated oocysts are round in size, 2.7-7.9 µm in size. Spores are oval in shape with a sharp tip. The size of the spore is 6.6-14.6x5-7 µm. A vestigial body is present in the sporocyst .

Endogenous development. Development takes place in the papillae in the epithelial tissue of the duodenum and in the upper part of the stomach . (Heisin, 1967). 2-3 days after infection, schizonts appear with 12-14 µm 6-11 merozoites of the first generation. By day 4, 2-18 merozoites of the second generation, 9-12 µm in size and 7-10 µm long, are formed. On days 4-6, merozoites of the third generation, 18-25 µm in size, 6-7 µm long and 1-1.5 µm wide, appear. By 4-5 days, the process of gametogonia begins. Microgametes are 15-25x9-17 microns on one side. The prepatent period is 5 days, the patent period is 6-8 days.

Eimeria Magna (Perard , 1925) - Oocysts are oval in size. The micropyle is cylindrical in appearance and is compressed on three sides. The oocyst shell is yellow-red or purple. The size of the oocyst is 26.6-41.3x17.3-29.3 μm, the average is 32.9-37.2x21.5-25.5 μm. The cytoplasmic state of the oocyst before spore formation is spherical. Once fully formed, the oocysts produce 4 oval-shaped spores, 15-7.8 μm in size, and a large residual body of 3.9-12 μm. The compressed and impenetrable angular body of the spore is clearly visible. In the spore, 2 pear-shaped sporozoites are formed. Between the sporozoites there is a residual body, oval or spherical in size, 3.9-4.9 μm in size.

Endogenous development. According to E. M. Heisin (1947), the endogenous process takes place in the air sac, in some cases, in the epithelial cell of the small intestine. According to H. E. Kocheganov (1954), the process of endogenous development takes place in the air sac, cecum, and in some cases, in the sac-like growth of the cecum. From the 4th day of damage, mature schizonts of the first generation with a volume of 11-17 μm appear, they contain 3-24 merozoites, and the length is equal to 7-11 μm. At the end of the 5th day, during the prepatent period, it was found that the 2nd generation of the schizont was 14-36 μm in size and 40-50 merozoites were 5-12 μm in size. In the third generation of adult schizonts, 25-80 merozoites 25-40 μm in size and 5-10 μm in length appeared 6-7 days after infection. On 7-8 days, one more generation of schizonts with a size of 25-48 μm appeared. Multinucleated merozoites appear on the 4th day of infection. On the 7-8th day, mature multi-centered microgametocides of 14-40 μm in size appeared . Microgametocides are 2 times smaller than microgametocides . Prepatent duration is 7-8 days, patent period is 15-19 days.

Eimeria irresidua Kessel et Jankiewiez, 1931 - Oocysts are elliptical or oval in size, the part containing micropyles is enlarged. The color of oocysts is dark orange - larger oocysts and smaller oocysts are lighter in color. The size of oocysts is 25.3-47.8x15.9-27.9 μm, the average is 35.1-40.8x20.2-23.8 μm (Heisin, 1967). Sporulation lasts 3-4 days. Oocysts do not have vestigial bodies. After the complete maturation of the oocysts, 4 ovoid spores 13.3-19.1x6.2-9.3 μm in size are formed. On the tip of the spore, Shtidovsky's body is clearly visible. The spore contains 2 elongated pear-sized sporozoites . Among them, there is a residual body of 4-9.3 μm, which is round, oval or irregular in shape.

Endogenous development. According to E.M. Heisin (1967), all stages mainly take place in the middle part of the small intestine. The schizonts develop in the apical part of the epithelial cell . The initial stage of gamonts is in the epithelial tissue, then the affected cell moves to the connective tissue, oocysts are measured. The author's opinion is that this type of schizonts appears in the 4-stage generation process. 12-20 merozoites, 10-13 μm in size, 5.8-10 μm in length, 1.5-3 μm in width, 5-15 merozoites, 6-10 μm in size, 5-8x1 in the first generation of schizont, 4 days after infection ,2-2.5 μm, in 5 days the third generation schizonts are 2-4 merozoites 5-7 μm in length, in 7 days the state of the fourth generation is 7-12 μm in size, 12-25 merozoites are 5-8 μm long. Primary gamonts appear after

infection. Microgametocides are multicentric and have a size of 30-60 µm. The prepatent period is 7 days, and the patent period is 10-13 days.

DISCUSSION

Currently , Eymer 's disease is one of the most common diseases among rabbits. R.A. _ _ _ _ _ Ts ion, C.T.shchennikov (1923) conducted research: When examining 45 rabbits, 34 (75%) rabbits were found to be infected with Eymerosis . V. L. Yakimov (1931) found that 100% of rabbits were infected with earworms in Leningrad. In 1930, when N.P. Orlov inspected a farm specializing in rabbit breeding in the Omsk region, he noted that 100% of rabbits were infected with these parasites.

neighboring Kazakhstan, rabbit eimeria was recorded for the first time by P.S. Ivanova-Gobzem (1935), 40 out of 53 animals examined in North Kazakhstan (75.5%) had 3 types of eimeria : E . stiedae , E. _ perforation and E. _ noted that it was damaged by magna . According to V.G. Nesmashnoy (1969), in Janasemeysk and Borodulikhinsk districts and in Semipalatinsk , E. stiedae , E. _ perforans , E. _ Magna and E. _ media types were noted. Rabbits of all ages are affected by Eimeria . Rabbits aged up to 3-4 months are the most affected. in less cases , rabbits up to 1 year old and adults were infected. Especially 20-60-day-old rabbits were seriously ill. First of all, thin, weak rabbits are affected by eimeria . Then the disease appeared in rabbits of other ages. In rabbits over 6 months of age and older, the disease is mild and they become carriers of the disease .

CONCLUSION

The epizootic spread of eimeria in rabbit farms coincides with the warm and wet season of the year, when the oocysts are exposed to sufficient conditions in the external environment, the spread of the disease increases. Rabbits are mainly infected or infected with diseases, and older rabbits are considered carriers of disease. During the spread of the disease, rabbits damage water, food, soil, bedding, various equipment, and the environment with their droppings.

In the external environment, oocysts reach the infected stage in 3-5 days at sufficient humidity and temperature. Rabbits are affected from the first day of their life, as a result of sucking their mother 's milk with contaminated udders and teats in unsanitary conditions . Damaged floors , blankets, food , water, and service equipment are considered to be affected by the spread of the disease.

Mice and rats are the main carriers and spreaders of the disease (pathogens) . These rodents are not considered to be the specific hosts of rabbit eimeria , but they can be found in garbage dumps, feeding on rabbit carcasses, ingesting eimeria or oocysts , and then spreading it throughout the area with their droppings .

One of the main reasons for the spread of the disease is the keeping of young rabbits together with older rabbits, feeding disorders, and changes in room temperature. In addition, the spread of the disease and the increase in the death rate are caused by the fact that rabbits are not fed with a complete diet, the presence of a small amount of vitamins and minerals in the feed, etc.

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