

## Original papers

## Epidemiology and economic benefits of treating rabbits coccidiosis in small farms from West Pomerania province, Poland

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**ABSTRACT.** The studies were carried out on 9 farms which deals with meat race of rabbits breeding. The basic herds had from 28 to 63 rabbits (total 275 rabbits) on Choszczno and Recz district in West Pomerania province. The study was based on two flotation methods: Willis-Schlaaf for qualitative and McMaster for quantitative analysis, which helped to establish the number of oocysts in 1g of feces (OPG). Ten species of coccidian were found in which 9 were intestinal (*E. exigua*, *E. perforans*, *E. media*, *E. magna*, *E. irresidua*, *E. coecicola*, *E. flavescens*, *E. piriformis*, *E. intestinalis*) and one was living in liver (*E. stiedai*). Baycox (Bayer) was used in drinking water in a dose of 25 ppm in 1 liter of water for 2 days. In rabbits from the experimental groups higher weight gain and lower mortality compared to the control group animals were observed. The results highlight the beneficial effects of coccidiostats used in the production effects in rabbits.

**Key words:** coccidiosis, *Eimeria* spp., rabbit, Baycox

### Introduction

The production of healthy food promotes the development of easy to digest products. Rabbits meat is said to be white, fine and with a small fat parts and with small cholesterol content is perfect for modern consumer needs. Except meat races, some of races are bred for fur production and also for medical and biologic aims [1]. Caring about meat quality extort on breeders a constant monitoring on animals health. One of the most common disease is coccidiosis which is one of the most pathogenic factor affecting on animals health. It could be a serious problem in rabbits breeding in big freight farms and also in small farmstead farms, experimental farms and in amateurish farms. This disease is caused by protozoan from *Eimeria* genus which are always present on farms and are practically impossible to exterminate [2]. Commonness of protozoan appearance from *Eimeria* genus causes very big economical losses

which contains: decrease of animal body weight in result of digesting disorder, bad absorption of food elements, dehydration, diarrhea, higher susceptibility for bacteria and virus infections, the death of rabbits babies, higher costs of fattening and connected with sick animals treatment [3–5]. The main direction of disposal is prevention which aim is to protect herd against invasion of protozoan from *Eimeria* genus by using an effective preparation. In European Union prevention and treatment is regulating by appropriate controls [6]. Modern coccidiostats should be high-effective, easy to take, has positive therapeutic index, wide spectrum of activities and low period of use.

Baycox has this properties and it's active substance is toltrazuril. This preparation has influence on schizogony and gamogony stage so on this forms of coccidiosis that growth continues in intestines epithelium.

The aim of the research was: to determine the species of coccidiosis in rabbits which are on small

farms area and to state the usefulness of Baycox preparation in prevention which decrease the occurrence in of coccidiosis in herds.

### Materials and Methods

The studies were carried out on 9 farms which deals with meat race of rabbits breeding. The research was carried on Choszczno and Recz district, West Pomerania province from March 2010 to February 2011. The basic herds have from 28 to 63 rabbits (total 275 rabbits). The herds was kept in closed buildings in single storey cages in groups. Animals were fed in traditional way using the products that was from farm (root vegetables, twig from the fruit trees, seed), they have also access to good-quality water. Rabbits were divided into 3 groups A, B and C (control), each amounted to 30 animals. In prevention of coccidiosis Baycox (Bayer) in dose 25 ppm i.e. 2.5% solution per 1 liter of drinking water was used. Baycox was given one time in 42th day of life (7 days after taking away from mothers: group A) and two times: in 42th day and 49th day of life (group B). Feces to coproscopy

tests research was taken three times: one time per month in 90 days fattening period. In 90th day of life the animals were killed. Rabbits were weight before the research started (35th day) and after research (in 90th day). There was made a section which was a basement to determine the species of coccidia occurring in individual parts of digestive system. Oocyst sporulation was performed in a moist chamber at 24–26°C. As a measure to prevent the growth of fungus the 2.5% aqueous solution of potassium dichromate ( $K_2Cr_2O_7$ ) was used [8,11].

Prevalence and intensity of infection with coccidian were determined by using a coproscopy tests: Willis-Schlaaf'a and McMaster'a methods. Feces for oocysts presence were examined 3 times in 35th day, 63th day and after the end of fattening. For all 3 groups was calculated a general number of oocysts per 1g of feces (OPG factor). The composition of coccidia species in studied rabbits was determined using a morphological quality of oocyst and it's sporulation time.

Statistical analysis was performed using Statistica 7.1 PL.

Table 1. List of *Eimeria* species occurring in rabbits from small farms in Choszczno and Recz, West Pomerania province

<i>Eimeria</i> species	Prevalence (%)	Intensity of infection
<i>E. exigua</i>	96.4%	0-400 50
<i>E. magna</i>	89.3%	1 600-38 820 54 500
<i>E. irresidua</i>	53.6	400-23 400 5 600
<i>E. flavescens</i>	16.5	40-1 600 8 800
<i>E. intestinalis</i>	50.0	0-350 175
<i>E. media</i>	88.5	800-30 400 34 950
<i>E. coecicola</i>	19.3	200- 26 300 149 300
<i>E. perforans</i>	23.5	350-26 030 47 400
<i>E. piriformis</i>	26	100-1 800 490
<i>E. stiedai</i>	23.0	830-1 500 640

Table 2. Intensity of infection with protozoa of *Eimeria* species following Baycox administration once and twice

Age in days	Groups		
	C	A	B
35	30 770	32 330	29 340
63	43 650	1 450	550
90	76 340	1 600	400

C: Control group; A: Baycox given once; B: Baycox given twice

## Results

In rabbits from small farms 10 species of coccidia, 9 intestinal and one living in liver, were found. Prevalence was 100% and average intensity of infection was 113 200 oocysts per 1g of feces. In all groups the dominants were 3 species. The general number of oocysts per 1g of feces before starting the research was similar in different groups and it was 31 320. In all farms was determined the mixed infection. After making the home slaughter the section studies shows the presence of protozoa from *Eimeria* genus (Table 1).

The influence of Baycox on coccidiosis progress was showed in Table 2 and 3. Before the experiment started the OPG factor was similar in different groups and it was: group C – 30 770, group A – 32 330 and group B – 29 340. The observation shows that in control group the intensity of infection increases during the experiment duration. After giving the preparation one and two times a substantial decrease of number of oocysts in examined animals was observed. Intensity of infection (OPG) for group A was 1450 and for group B was 550 oocysts per 1g of feces. The infection caused by different species from *Eimeria* genus also decreased. In group A was determined 5 species: *E. stiedai* (*E. magna*, *E. intestinalis*, *E. flavescens*, *E. exigua*) and in group B – 3 species of protozoa (*E. magna*, *E. intestinalis*, *E. exigua*).

The economic analysis was based on weight growth during the research. The growth of body weight in experimental groups was higher than in control group. Baycox used 1 and 2 times showed the coccidiostatics action which was documented statistically.

## Discussion

Coccidiosis is still a serious problem in many countries in the world. It could be responsible for high deaths of rabbits on farms [9,10]. This protozoan was characteristic from different level of pathogenicity and affinity to individual parts of rabbit intestine, that's why the really important issue is to understand the biology of this parasites. Up to this time was identified in rabbits 15 species from *Eimeria* genus: 14 living in intestines except from *Eimeria stiedai* which lives in bile duct. In literature were described the species: *E. perforans*, *E. piriformis*, *E. exigua*, *E. media*, *E. magna*, *E. coecicola*, *E. vejnovskyi*, *E. flavescens*, *E. intestinalis*, *E. nagpurensis*, *E. irresidua*, *E. matsubayashi*, *E. elongate* and *E. neoleporis* [4,5,8]. But the economic meaning have 8 of them [3]. The research about prevalence was carried on the whole world. In China [13] was researched the material from 48 farms in 14 province. The prevalence 41.9% and 10 species of *Eimeria* were identified. The most common species were *E. perforans* – 35.2%, *E.*

Table 3. The effect of single or double Baycox administration on body weight of rabbits (g)

Age in days	Groups					
	A		B		C	
	x	V	x	V	x	V
35	891	21.3	89.5	19.7	884	21.1
90	2562	12.9A	2573B	11.8	2223 AB	11.6

V - coefficient of variation

*media* – 31.3%, *E. magna* – 28.8%, *E. irresidua* – 19.4% and *E. intestinalis* – 1.8%.

Coccidiosis in rabbits is generally liver disease caused by *Eimeria stiedai* [14–16].

In Egypt where the rabbit meat is a valuable source of animal protein was carried out research on coccidiosis in rabbits. It was the first time that six *Eimeria* species was determined and described. It was generally a mixed infection. Research was carried on mostly on small farms [17].

Research was also carried on in Saudi Arabia about frequency of coccidia presence in rabbits in home farms. The level of wormed rabbit was 75%. There was determined 10 species of *Eimeria* species. There were mostly a mixed infections which were built of 3 different species. The most common species are *Eimeria coecicola* (70%), *E. magna* (60%), *E. perforans* (60%) and *E. media* (55%). *E. stiedai* (5%) and *E. exigua* (5%) were relatively rare. Eight species were determined earlier, 2 extra species (*E. exigua*, *E. piriformis*) were noticed first time in Riyadh region. This research will help in making a good strategy to fight against this disease [18].

In Europe we can observe a growing interest in rabbits coccidiosis. For particular attention deserve the complex research that was carried on in France in 70th and 80th years. The authors determined coccidia and they made a precise analysis individual stage of growth, they determined of morphological features oocyst in different species. Also conducted research on the degree of pathogenicity and locating of individual species in the gastrointestinal tract, followed oocysts sensitivity to temperature and the resistance phenomenon investigated during the course of coccidiosis in rabbits [19,20]. Considered to be the most pathogenic species of *E. intestinalis* and *E. flavescens*, and that lives in the liver *E. stiedai*. Less pathogenic species do not reduce the incidents of fatal but they lower the weight gain, cause severe diarrhea [19].

Infections caused by protozoa are born with. *Eimeria* have huge economic importance and often lead to huge losses in the production of rabbit meat. Even sub-clinical forms of intestinal and hepatic coccidiosis may lead to a decrease in body weight gain, intestinal and hepatic dysfunction, diarrhea, cachexia [21,22]. The rearing of rabbits in Poland generally is a smallholder production because controlling coccidiosis is mainly based on symptomatic treatment. Research on the run for the

last decade in Poland on coccidiosis in rabbits mainly related to the presence of protozoa of the genus *Eimeria* in large industrial farms research focuses mainly on: determining species composition, assessment of infected rabbits, determining the dynamics of their occurrence and the development of preventive programs to reduce instances of invasion [23,24].

Also described the occurrence of endoparasites in the conduct of routine post-mortem rabbit carcasses. Coccidia were found in 48.3% of the studied cases [25].

Rabbits for slaughter are usually only carriers of coccidia, and acquired during the earlier invasion resistance makes these parasites do not usually cause serious pathological changes in the gut. As shown by previous studies on coccidiosis in rabbits, as it relates to young individuals in whom the development of this disease can be severe, and the mortality rate high. Therefore, it is important the early use of coccidiostats [26]. Coccidiosis rabbits may result in poor condition, anorexia and diarrhea. After treatment (toltrazuril Baycox®) and combinations of substances praziquantel, and pyrantel embonate febantel (Drontal® Plus), most of these symptoms subsided, and has also seen a reduced number of oocyst shedding [27]. Research on the prevention of coccidiostats usefulness carried out in the experimental conditions and using Diclazuril field, salinomycin and Robenidine. Both economic performance (weight gain, feed intake, feed) and parasitological parameters (OPG and identification of species) were significantly worse in the control group than in grupaC who received coccidiostats [28]. However, in order to avoid the emergence of drug resistance is also recommended implementation of the programs in rotation].

Although definitely known coccidia species and its pathogenicity in rabbit, coccidiosis is a major problem in these animals, regardless of farms size worldwide. Exact knowledge of the biology of protozoan *Eimeria* will contribute to the development of prevention programs that stop the spread of the disease in rabbits. The results highlight the beneficial effects of coccidiostats used in the production effects in rabbits.

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