

## Original papers

## Occurrence of coccidia infection in pigeons in amateur husbandry. Diagnosis and prevention.

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**ABSTRACT.** Coccidiosis caused by *Eimeria* spp. is a common parasitic disease posing a serious problem in pigeon keeping. The aim of the study was to determine the species composition, the degree of coccidia infection and the effect of the coccidiostat used in the course of the disease in two pigeon lofts located in the West Pomerania province. The material for the study came from 180 birds. A total of 330 faecal samples were investigated with two methods: Willis-Schlaaf's (qualitative) and McMaster's (quantitative). The pigeons were given the Baycox (Bayer) coccidiostat with toltrazuril as an active substance. The medicament was administered for two days at a dose of 20 mg/kg body weight at three-day intervals. Three species of protozoa were isolated: *Eimeria labbeana*, *E. columbarum*, *E. columbae*, and the infections were mixed. The occurrence of *E. labbeana* was most commonly reported, which was shown, depending on the pigeon loft and the age of the birds, in 89–93% of young pigeons and in 63–55% of adults. The species *E. columbarum* and *E. columbae* were found less frequently. Baycox coccidiostat proved to be highly effective against coccidiosis in pigeons and may also be used in prophylaxis.

**Key words:** pigeon, coccidiosis, coccidiostat, Baycox

### Introduction

Coccidia are protozoa that are common pathogens in pigeons. The literature around the world describes nine species of the genus *Eimeria* and one of the genus *Isospora*, but only three species are of significance: *Eimeria columbae*, *E. columbarum* and *E. labbeana*, which are characterized by varying degrees of virulence. *E. labbeana* was first described in 1928, while *E. columbae* in 1953. The occurrence of these species was found in domestic pigeons (*Columba livia domestica*) and rock pigeons (*Columba livia livia*) [1]. The most pathogenic and most frequently observed species is *E. labbeana*, which lives in the small intestine of pigeons. The prepatent period of the protozoan is 8 days, and sporulation takes 48 hours. Other species of coccidia are of less importance. In practice, the infections are mixed, which increases their pathogenicity.

The most vulnerable to infections are carrier and sporting pigeons, as they perform a large number of

flights in the so-called racing season. This leads to substantial exhaustion of birds and, consequently, increases their susceptibility to various diseases, including infections with salmonellosis, paramyxoviruses, circoviruses, trichomoniasis, etc. [2,3]. The parasites affect the health of pigeons and are among the most common pathogens which reduce flight effectiveness [3].

Coccidiosis usually runs without clear clinical manifestations. The pigeons look healthy, but they are less active. In sporting pigeons faster tiring and watery diarrhoea occur. In young individuals the disease is acute. Sick pigeons fledge badly; the feathers are dead and brittle. Loss of weight and expelling faeces streaked with blood are characteristic symptoms. Youth mortality ranges from 5% to 30%. Moreover the inhibition of growth and balance disorders are observed [4].

Coccidiosis mainly affects thoroughbred and wild birds aged from 4 weeks to 4 months. One infected pigeon may expel from a few to hundreds of millions of oocysts per day. The source of the

Table 1. Prevalence and intensity of infection with coccidia species found in studied pigeons in Western Pomerania

Pigeon loft	Number of examined pigeons	Prevalence (%)	Mean egg count per 1 g of faeces (OPG) (range)		
			<i>E. labbeana</i>	<i>E. columbarum</i>	<i>E. columbae</i>
I young	19	89	12000 (630-24500)	1100 (0-6200)	30 (0-620)
I adult	43	63	8500 (0-19000)	950 (0-2200)	25 (0-470)
II young	51	93	10500 (700-22000)	4500 (0-9000)	30 (0-550)
II adult	67	55	750 (0-1900)	330 (0-6500)	10 (0-200)

invasion is faeces containing oocysts. Oocysts may also be found in water, litter and feed [4]. Knowledge of general principles of biology and the life cycle is needed for the effective fight against coccidia.

Oocysts excreted in the faeces are not pathogenic, but in the loft with proper humidity and temperature they mature, become invasive and able to infect birds. It is important that this period in relation to *Eimeria* detected in pigeons is relatively short. The invasive forms are fully sporulated oocysts which are sensitive to desiccation, high temperature, and sunlight. This means, in practice, the permanent presence of invasive oocysts in the loft environment.

Hence, it becomes necessary to counteract the parasitosis by means of chemoprophylaxis.

The aim of the study was to establish the species composition and the degree of infection with coccidia as well as to determine the effect of the selected coccidiostat on the course of disease in examined birds from selected lofts of the Western Pomerania region.

## Materials and Methods

Parasitological research was carried out in two lofts located in the West Pomerania province.

**Pigeon loft I:** the basic flock consists of 62 domestic birds, including 43 adult and 19 young individuals. **Pigeon loft II:** the basic flock consists of 118 domestic birds, including 51 adult and 67 young individuals.

The study was conducted from March to December 2009. During this period a total of 330 faecal samples were examined. The faecal samples were tested using two coproscopic methods: Willi-

Schlaff's (qualitative) and Mc. Master's (quantitative).

The species composition of coccidia was determined on the basis of morphological characteristics of oocysts and their sporulation time. For this purpose, the key according to Eckert was used [5].

The pigeons were given Baycox (Bayer) coccidiostat with toltrazuril as an active substance. The medicament was administered in drinking water for two days at a dose of 20 mg/kg body weight at three-day intervals.

## Results

Three coccidian species were isolated in the test material: *Eimeria labbeana*, *E. columbarum*, *E. columbae*, and the infections were mixed. *E. labbeana* were most commonly observed, which was shown depending on the loft in total and the age of the birds, in 89–93% of young pigeons and 63–55% of adults. A slightly lower incidence of *E. columbarum* and *E. columbae* species was detected (Table 1). In the first loft the mean egg count per 1 g of faeces (OPG) defining infection intensity was 12000 at the range 630–24500 for *E. labbeana*; in the case of *E. columbarum* 1100 (0–6200), and 30 (0–620) in the case of *E. columbae* (Table 1).

The second pigeon loft was characterized by a slightly lower prevalence and amounted for *E. labbeana* to 10500 for young and 750 oocysts per gram for adult birds.

The pigeons were treatment with Baycox. Intensity of infection was determined 7 and 14 days after administration of the medicament. In the experimental pigeons reduction in the intensity of

Table 2. Results of treatment with Baycox (Bayer) preparation in pigeons

Pigeon loft	No. of pigeons	Intensity of infection (OPG)		
		Before treatment	After treatment 7 days 14 days	
I	62	22 605	1400	100
II	118	16 120	900	50

coccidian infection was observed in 7<sup>th</sup> and 14<sup>th</sup> day after administration, respectively. After termination of the experiment in 14<sup>th</sup> day the infection intensity for loft I was 100 and for loft II – 50 oocysts per gram of faeces (Table 2).

## Discussion

Studies of endoparasites, including coccidia in pigeons, were carried out throughout the world and concerned both domestic and wild pigeons. The species composition of intestinal parasites residing in these birds and the course of invasion in various regions of the world with different geoclimatic conditions were determined. The studies were conducted, among others, in India, [6,7], Brazil [8], Turkey [9,10] Bulgaria [11], Botswana [12], Slovenia [13] and Nigeria [14]. Extensive studies on parasites of pigeons were performed in Brazil [10]. The degree of infection of pigeons in urban areas of Lagos in the state of Santa Catarina was assessed and it reached a total of 74.14%.

Prevalence of *Eimeria* species reached 100%. Mixed infections with three species were found in total in 11.62% of tested samples. The research on urban pigeons (*Columba livia f. urbana*) in Recife, north-eastern Brazil, showed that 29.9% of the birds were infected with protozoa. *Capillaria* sp. and *Ascaridia* sp. were also frequently detected [15]. In addition, studies on the infection of domestic pigeons (*C. livia domestica*) in the state of Minas Gerais, in south-eastern Brazil, revealed oocysts of *Eimeria* sp. in 4.91% of the examined birds and these were two-species infections [8].

Studies on prevalence of endoparasites in pigeons in the Canary Islands showed that coccidia were present in 50% of examined animals [16]. In Europe, extensive studies were carried out in Turkey, where 251 pigeons (136 domestic and 115 wild) were examined. Domestic pigeons were more infected and coccidia oocysts were demonstrated in 81 (59.6%) individuals while in wild pigeons only in 35 (30.4%) birds. *E. labbeana* was the species

most frequently observed and its presence was demonstrated in 58.1% of domestic pigeons and 28.7% of the wild. The intensity of infection with other species of coccidia was also high and in domestic pigeons it was: *E. columbarum* – 30.9%, *E. columbae* – 22.1%, *Isospora* sp. – 18.4%, and for the wild birds – 10.4%, 5.2% and 13.0%, respectively.

Mixed infections with intestinal nematodes and coccidia were found in 42% of domestic pigeons and in 14.3% of the wild. As can be seen from the research, parasitic infection was greater in domestic pigeons than in the wild [9]. In Istanbul (Turkey), in feral pigeons nesting in famous mosques, mixed infections of coccidia and nematodes were detected: *Capillaria obsignata* – 19.3% and *Ascaridia columbae* – 14.6% [17]. Moreover, mixed infections were described in other regions of Turkey: *E. labbeana* and *E. columbarum* were found in wild pigeons which were infected in 15.1% [18]. In the northern parts of Nigeria the research conducted on the prevalence of infestation in pigeons revealed that nearly half of the pigeons were infected with protozoa of the genus *Eimeria* (49.2%). The authors believe that the reason for such high prevalence lies in the method of rearing pigeons. In parts of Nigeria birds are mainly kept free range, which favours the spread of parasites [19]. In domestic pigeons infections with endoparasites are usually mixed and often include two species of protozoa: *E. columbarum* and *E. labbeana*. The prevalence of infection varies from 5.1% to 71.9%. Worldwide, mortality caused by infection with endoparasites in young pigeons ranges from 5% to 70%, with most deaths occurring in the third and fourth months of age [1]. Studies on coccidiosis in pigeons were also performed in Poland. It was shown that a common problem in pigeons during racing season are protozoa which affect the race results and contribute to bird loss [20].

Observations were carried out on the degree of coccidian infection in pigeons taking part in competitions. Greater prevalence was demonstrated

in individuals participating in flights than in those remaining in the loft. Higher prevalence resulted both from weakening of birds during flights and the possibility of contamination with coccidia oocysts of pigeon shipping crates and bodies of water from which the birds drank on the route of flights [21].

A comparative study was also performed on the incidence of parasitic infections in carrier and fancy pigeons. The birds were infected with protozoa of the genus *Eimeria* in more than 50% regardless of the species. The prevalence was 56.4% for carrier pigeons and 90.9% for fancy pigeons [22]. The medicament chosen to control coccidiosis in pigeons is toltrazuril (Baycox), which is characterized by high efficiency. It is administered once at a dose of 20 mg/kg body weight and is effective against experimental coccidiosis in pigeons causing 97% reduction in oocysts [23,24]. Similar results were obtained by Pilarczyk et al. [25], where Baycox added to water proved to be highly effective against coccidiosis in pigeons. Prior to treatment the authors found 25000 oocysts in 1 g of faeces, after 7 days – 200 oocysts in 1 g of faeces, and after 14 days – 50 oocysts in 1 g of faeces. The research conducted by Szeleszczuk [4] and Michalczyk et al. [21] also confirmed high efficacy of the medicament in parasitological prevention. Usage of Baycox in pigeons does not inhibit the production of natural immunity against coccidiosis, but only prevents the development of clinical disease [21]. In conclusion, it should be noted that using Baycox in pigeons results not only in health improvement, but also in obtaining better economic outcome. Therefore, there is a constant need to monitor the infestation status of birds in order to avoid possible losses in pigeon breeding.

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Received 31 March 2014

Accepted 1 May 2014