

Original papers

Coccidia infections in homing pigeons of various age during the racing season

Małgorzata Raś-Noryńska, Maria Michalczyk, Rajmund Sokół

Department of Parasitology and Invasive Diseases, Faculty of Veterinary Medicine, University of Warmia and Mazury, 13 Oczapowskiego Street, 10-957 Olsztyn, Poland

Corresponding author: Malgorzata Raś-Noryńska; E-mail: malgorzata.ras@uwm.edu.pl

ABSTRACT. Coccidiosis caused by *Eimeria* spp. is a common parasitic disease in homing pigeons. The study objective was to evaluate the incidence of coccidia infections in pigeon lofts during racing season. The intensity of coccidiosis was determined by floatation analyses of faeces samples collected from three pigeon groups performed in three replications (before the racing season, in mid-season and after the end of racing season). The presence of coccidia oocysts was determined in all faeces samples in each replication. At the end of the racing season, the average oocyst counts in faeces samples collected from pigeons that were flown for the first time increased by around 10% in relation to oocysts counts determined before the race. In flown pigeons (aged 2–4 years) a 2.5–9.9% drop was noted in oocysts counts subject to flock, whereas an increase of 15.7–17.3% was reported in parent flocks (unflown pigeons). The results of the experiment indicate that coccidia infections are a common problem in homing pigeons during racing season, which affects racing results and contributes to bird loss.

Key words: coccidiosis, homing pigeons, racing season

Introduction

Pigeon coccidiosis is caused by protozoa of the genus *Eimeria*: *E. labbeana*, *E. columbarum* and *E. columbae*. Coccidiosis is one of the most common parasitic diseases in homing pigeons. Prevalence of coccidia infection in pigeons in Poland and Europe is estimated to be 50–100%, depending on the studied population [1–6]. The disease caused mainly by *E. labbeana* is manifested by weakened immunity and periodic watery droppings. Full-blown symptoms of coccidiosis are observed mostly in young birds, frequently leading to their death. Resistance to the disease developed by older birds with age may be broken in periods marked by increased metabolic effort, such as feathering or frequent long-distance flights [2,7]. Domestic pigeons (*Columba livia domestica*), particularly homing pigeons, have been reared by both amateur and professional breeders for generations. Depending on utility type or age and designation, pigeons are reared in confined (aviary) or semi-confined systems. Other pigeon types, including ornamental birds and pigeons bred for meat, are largely isolated from pathogenic factors. In these groups invasive diseases result mainly from cross-infection in the pigeon loft (horizontal disease transmission) [2,3,6].

The aim of this study was to evaluate the intensity of coccidia infections in pigeon lofts during the racing season.

Materials and methods

The analyses of faeces samples were carried out in 2009 in two pigeon lofts in the Olsztyn area (Poland) before the racing season (June), in mid-season (August) and after the end of the racing season (September). In every examination 30 collective faeces samples (of 15 g each) were obtained from different parts of each loft. In the laboratory the faeces samples were mixed and from each collective sample 1g was analyzed by the floatation method proposed by Fülleborn [8] with

the use of 5 ml Darling's solution (50% saturated salt solution and 50% glycerol). The samples were centrifuged (2200 rpm for 6 min), supernatant drops were collected with an inoculation loop, they were transferred to a microscopic slide and examined under a microscope at 400× magnification. Oocysts were counted in five fields of view and the average counts were used to determine the intensity of coccidia invasions.

Faeces samples were collected from a total of 573 birds. The pigeons from both flocks were divided into three groups subject to age: group I – young (under 1 year of age) pigeons flown for the first time, group II – flown pigeons (>1–4 years), and group III – older pigeons (>4 years of age) kept for breeding purposes. Each group was kept in a separate loft without possibility of contact. Flock A comprised 356 birds, including group I (n=180), group II (n=110) and group III (n=66) pigeons. Flock B totalled 219 birds, including group I (n=72), group II (n=95) and group III (n=52) pigeons.

Prior to the experiment faeces were removed from the lofts; the walls, floors and ceilings were sprayed with Agrisan8090® (Agrivet s.j) disinfectant (dose of 50–100 g/m^2).

Results

Coccidia oocysts were determined in all the faeces samples collected from both studied flocks. Before the racing season, the average oocysts counts in flock A birds reached 17.6 in group I, 31.2 in group II and 22.5 in group III. In flock B, the average oocysts counts in faeces samples were determined at 21.1 in group I, 24.5 in group II, and 22.9 in group III (Table 1). The second analysis of faeces samples was performed in August, in the middle of the racing season after the second racing flight. The average number of coccidia oocysts increased in all bird groups of both flocks. The average oocysts counts in the faeces samples collected from flock A pigeons increased by 3.5% in group I, 10.5% in group II, and 8.4% in group III. In flock B, the average increase in oocysts counts reached 6.6% in the group of young pigeons, 2.4% in flown pigeons and 5.7% in the group of breeding birds. In September, faeces samples were subjected to a third analysis after the end of the racing season, and the average oocysts counts in flock A reached 19.5 in group I, 28.1 in group II, and 26.4 in group III birds. In flock B, the average oocysts counts were determined at 23.1 in group I, 23.9 in group II, and 26.3 in group III.

Between August and late September, the racing pigeons from both flocks took part in four racing flights. In the group of birds flown for the first time, the percentage of pigeons that did not return from the race amounted to 53.3% in flock A and 50% in flock B. The losses reported in the group of older pigeons (>1–4 years) were lower amounting to 20% in flock A and 18.9% in flock B. The overall loss totalled 40.7% in flock A and 32.3% in flock B (Table 2).

Discussion

Coccidiosis affects the birds' health condition and racing results [9]. Older birds are generally believed to develop resistance to the harmful effects of coccidia. Despite minor invasions, they do not show symptoms of parasitic invasion and become reservoirs of protozoan infection. Acute symptoms of coccidiosis, such as diarrhoea and sudden death, are observed mainly in chicks and young birds [2,10–12]. High stocking density contributes to oocysts accumulation and the spread of the invasion. Coccidiosis poses a particularly high threat to pigeons which are transported to racing events in cages from various breeding farms [3,9]. Transport-related stress may lower the birds' immunity, increasing the number of excreted oocysts and maximizing the birds' susceptibility to coccidia infections. Racing birds are regularly trained and provided with an adequate housing and nutritional regime, therefore they are generally in better health than breeding pigeons. The results noted in this experiment suggest that coccidiosis is a common problem in homing pigeons. Before the racing season, the intensity of coccidia infections was notably lower in flock A birds kept in relative isolation (17.7 and 22.5 oocysts in the field of vision) than in the group of flown birds (31.2 oocysts). In flock B, infection rates were more evenly distributed, reaching 21.2–22.9 oocysts in the field of vision in confined birds and 24.5 in racing birds. Parasitological analyses carried out during the racing season indicated elevated oocysts counts in the faeces of each age – group in both flocks. After the end of the racing season, the number of excreted oocysts in the group of young birds and breeding birds was marked by an increase (19.5 and 26.4 oocysts in the field of vision in flock A, and 23.1 and 26.3 oocysts in the field of vision in

Table 1. Mean counts of oocysts in the dropping sample in relationship to the period of racing season and group of pigeons

Loft	Mean count of oocysts								
	Before season (June)			In the middle of the season (August)			After the season (September)		
	in group								
	I	II	III	I	II	III	I	II	III
A	17.6 (1.8-67.6)	31.2 (4.4-67.2)	22.5 (1.2-106)	18.2 (2.4-74)	34.5 (4.8-70.2)	24.4 (1.6-110)	19.5 (2.5-72.4)	28.1 (2.4-70.2)	26.4 (1.8-110)
B	21.2 (1.2-78)	24.5 (3.8-65)	22.9 (1-49.6)	22,6 (1.5-79)	25,1 (4.2-70.2)	24.2 (1.6-50.5)	23.1 (2-81.2)	23.9 (3.2-67)	26.3 (2.2-54.2)

Explanations: group I – young (under 1 year of age) pigeons flown for the first time; group II – flown pigeons (>1-4 years); group III – older pigeons

flock B), while a drop in oocysts counts was noted in the group of racing birds aged >1–4 years (from 31.2 to 28.1 in flock A, and from 24.5 to 23.9 in flock B). Racing flights lead to bird loss for various reasons like predators, accidents, aberrations. Faeces samples were collected from birds that had raced in four flights. Bird losses ranged from 18.2% to 55.6%, depending on age. It can be assumed that the lost birds were the weakest individuals characterized probably also by the highest intensity of coccidia infection. This hypothesis would explain the general drop in oocysts counts in faeces samples collected from flown pigeons after the racing season. Elevated levels of excreted oocysts in flown birds before the racing season may be attributed to increased contact with wild birds, infections resulting from the consumption of water from unknown sources as well as increased training effort [3,9]. The pigeons kept in an aviary were less exposed to the above threats. Lower parasite counts are reported in racing birds kept in relative isolation. Owing to lower exposure to parasites, young birds are more likely to build up natural immunity to coccidiosis. Coccidia infections constitute a more serious problem in older breeding birds which, even if kept in isolation from the external environment, become a reservoir of coccidiosis in the loft and pose a threat for their offspring. In practice, coccidia cannot be completely eliminated without breaking the infection chain [13]. Unsuccessful eradication of oocysts from the pigeon loft, combined with an incomplete elimination of the existing infections, leads to recurrence of coccidiosis [1,4,14,15]. Such situation necessitates pharmacological treatment following a prior diagnosis of infection level.

References

[1] Gaweł A., Czernichowska A., Jurowski J. 1994. Intensywność i ekstensywność zarażenia gołębi *Eimeria* sp. na terenie Dolnego Śląska. Konferencja naukowa „Weterynaryjne, żywieniowe i środowiskowe problemy w intensywnej produkcji drobiarskiej", Wrocław (conference materials).

[2] Kaleta E.F, Bolte A.L. 2000. Vorkommen und Bekämpfung der Kokzidiose der Tauben, Prakischer Tierarzt 81: 476-482.

[3] Stenzel T., Koncicki A. 2007. Ogólne zasady prowadzenia opieki weterynaryjnej nad stadami gołębi. *Magazyn Weterynaryjny* supp.: 56-60.

[4] Sari B., Karatepe B., Karatepe M., Kara M. 2008. Parasites of domestic (*Columba livia domestica*) and wild (*Columba livia livia*) pigeons in Nigde, Turkey. *Bulletin of the Veterinary Institute in Pulawy* 52: 551-554.

Table 2. Losses of the pigeons

Loft	Number of pigeons		Loss	Loss (total)
A	First racing season	180	96 (53.3%)	118 (40.7%)
	>1-4 years old	110	22 (20%)	
B	First racing season	72	36 (50%)	54 (32.3%)
	>1-4 years old	95	18 (18.2%)	

[5] Van Reeth K., Vercruysse J. 1993. Efficacy of Toltrazuril against experimental infections with *Eimeria labbeana* and *E. columbarum* in racing pigeons. *Avian Diseases* 37: 218-221.
[6] Yabsley M.J., 2008. Eimeriae. In: *Parasitic diseases of wild birds*. (Eds. C.T. Atkinson, N.J. Thomas, D.B. Hunter). Willey-Blackwell, Ames: 162-180.
[7] Stenzel T., Koncicki A. 2007. Occurrence of parasitic invasions in domestic pigeons (*Columba livia domestica*) in the northern Poland. *Polish Journal of Veterinary Sciences* 10: 275-278.
[8] Fülleborn F. 1920. Neuere Methode zum Nachweis von Helminteneirn. *Archiv fűr Schiffs und Tropen Hhygiene* 24: 174-176.
[9] Rupiper D.J. 1998. Diseases that affect race performance of homing pigeons. Part II. *Journal of Avian Medicine and Surgery* 12: 138-148.
[10] Hunt S., O'Grady J. 1976. Coccidiosis in pigeons due to *Eimeria labbena*. *Australian Veterinary Journal* 52: 390.
[11] Page C.D., Haddad K. 1995. Coccidal infections in birds. *Sem Avian Exotic Pet Medicine* 4: 138-144.
[12] Szeleszczuk P. 2002. Baycox – nowe możliwości terapii i profilaktyki kokcydiozy gołębi. *Magazyn Weterynaryjny* 11: 65-68.
[13] Szeleszczuk P. 1995. Praktyczne uwagi na temat terapii i profilaktyki chorób gołębi domowych. *Magazyn Weterynaryjny* 4: 25-30.
[14] Piasecki T. 2006. Ocena stanu zdrowotnego gołębi miejskich w aspekcie zagrożenia zdrowia ludzi. *Medycyna Weterynaryjna* 62: 531-535.
[15] Pilarczyk B., Balicka- Ramisz A., Ramisz A., Laurans Ł. 2006. Baycox and intensity of coccidia invasion in pigeons. *Annals of Animal Science* 6: 331-335.

Received 30 April 2011
Accepted 2 June 2011