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GASTROINTESTINAL HELMINTHS AND COCCIDIA INFESTATION OF CITY PIGEONS (*COLUMBA LIVIA* FORMA *URBANA*) ON SELECTED MONUMENTS IN SZCZECIN

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ABSTRACT

City pigeons (*Columba livia forma urbana*) are an integral part of the urbanized environment. However, they host parasites that can be passed zoonotically to humans and to domestic and wild birds. The aim of the study was to establish the current prevalence of nematode and coccidians infestation among city pigeons roosting in old buildings in Szczecin. The pigeon kits, comprising city pigeons and stray breeding pigeons which had not returned to their lofts, numbered from 45 to 60 individuals. Samples of pigeon droppings were tested qualitatively by the flotation method and then quantitatively by the McMaster technique. Oocyst culture was also performed in a humid chamber at a temperature of 24–26°C. The oocytes were identified using standard keys. Two roundworm families were identified, *Ascaridia* spp. (two species) and Capillaria spp., and three coccidian species: *Eimeria labbeana*, *E.columbarum* and *E. columbae*. Overall, the extent of infection was approximately 100% throughout the study area, but varied depending on the place of origin of the material. The prevalence of worms with eggs ranged from 9% to 16% for *Ascaris* spp. and 24–41% for *Capillaria* spp. The maximum OPG values, i.e. the number of oocytes per gram of faeces, were 360 for *Ascaris spp.* and 1134 for *Capillaria spp*; these indicate the intensity of infection. The most frequently observed species was *Eimeria labbeana*, whose prevalence was found to range from 82% to 96% depending on location, with a mean infection intensity of 1130–1870 OPG. The prevalence of the other two *Eimeria* species was also high, with respectively values of 56–77% for *E. columbarum* and 32–43% for *E. columbae*, depending on the location. The mean OPG values for the species were 430–1770 and 29–52, respectively. Maximum OPG values were 223,000 for *E. labbeana*, 54,000 for *E. columbarum* and 830 for *E. columbae*.

Key words: pigeons (*Columba livia forma urbana*), nematodes, coccidiana, monuments, Szczecin (Poland)

INTRODUCTION

City pigeons (*Columba livia forma urbana*) are integrated into the urbanized environment, and can be seen in varied locations ranging from parks and town squares to the attics, window sills and balconies of houses and church towers. Pigeons generally prefer to nest in old buildings, where they create nests made of sticks and stalks on balconies, window sills or lofts to lay eggs and rear offspring [Helb 2018].

They have taken over most of the districts of Szczecin, and many have settled in derelict buildings, including those planned for revitalization. They have also begun to occupy lofts and flat roofs, and the cornices over

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the balconies. Unfortunately, the uric acid in their droppings poses a danger to historic buildings by penetrating the façades and the pigeons themselves also present a sanitary and epidemiological risk to residents by acting as a source of infection: their droppings and feathers are excellent breeding grounds for numerous insects and mites, as well as fungi, bacteria and parasites [Kaleta and Bolte 2000, Tomczuk et al. 2017]. The most common pathogens borne by pigeons worldwide are intestinal worms [Satish and Priti 2013]. Such infections prevent successful pigeon breeding, due to reduced resistance to other infectious agents, growth retardation, weight loss, reduced feed conversion, general ill health, and sometimes death and economic loss [Parsani et al. 2014]. They can also serve as substitutehosts for many nematodes, infecting domestic fowl due to their close interactions and close phylogenetic relationship [Adang et al. 2008a], and a source of various zoonotic infections in humans and birds [Sivajothi and Sudhakara 2015].

In addition, by mixing with migratory birds, pigeons are able to transmit disease on both the regional and international scales. Furthermore, when being transported to races and during their flights, racing pigeons come into contact with other birds of unknown medical status, and can bring diseases back to their own flocks. They can also acquire infections following contact with city pigeons [Bobrek et al. 2012].

Pigeons can also transfer zoonoses through contact with humans or other domestic and wild birds [Adang et al. 2008b]. Internal pigeon parasites can be classified according to their taxonomy and their preferred area of the digestive tract. However, among the many disease-causing factors carried by pigeons, endoparasites merit special attention. The most commonly identified endoparasites in pigeons are the nematodes of the *Ascaridia* family and the protozoa of the *Eimeriidae* family. In Europe, the primary causes of coccidiosis in pigeons are *Eimeria labbeana*, *E. columbarum* and *E. columba* with the most pathogenic being *E. labbeana* [Frindt et al. 2000].

Many species of city pigeons are protected by Polish law (point 12, no. 2, Ministry of the Environment legislation dated 12 October 2011 regarding the protection of animal species Dz. U. nr 237, par 1419).

The aim of the study was to establish the current state of parasite infestation among city pigeons roosting in old buildings in Szczecin.

MATERIAL AND METHODS

Study area

Group I: The area around historic interwar red-brick buildings, located in front of the Giedroyc roundabout (former Yitzhak LejbPerec Primary School).

Group II: Zespół urbanistyczno-architektoniczny (*The city and architectural complex*) located at streets Broniewskiego and Chopina.

Group III: A listed four-story tenement building at plac Zgody, constructed at the end of the 1880s. A building located on the corner of Księcia Bogusława X street.

In the study area, the pigeons were found to nest mainly on building elevations (windowsills, pipes, cornices) and in nearby trees.

The flocks numbered from 45 to 60 birds; they comprised both city pigeons and those previously kept for breeding but which did not return home; the latter could be identified by their rings. Research in pigeons were performed in spring 2017.

Parasitological analysis

The research material consisted of 90 collective samples of stools. The faecal samples were tested using two coproscopic methods: the Willi-Schlaff qualitative method and the McMaster quantitative method. The species composition of coccidia was determined based on the morphological characteristics of oocysts and their sporulation time, according to Eckert. For the sporulation of oocysts, faecal samples were dissolved in a 2.5% aqueous solution of potassium dichromate ($K_2Cr_2O_7$) in Petri dishes. Dishes were placed in a moist chamber at 24–26°C and checked daily until sporulation. Oocysts, sporocysts, sporozoites and other structures were observed by light microscopy in immersion oil (1000×). The overall number of oocyst/egss per gram of feces (OPG/EPG) was calculated in all faecal samples [Eckert et al. 1995].

RESULTS

Two species of nematode were identified, *Ascaridia spp.* and *Capillaria* spp.; three coccidian species were also found: *Eimeria labbeana*, *E. columbarum* and *E. columbae*. These invasions were characterised by varying degrees of virulence, and different taxa. The worming status was approximately 100%, but the worming status differed from the material origin.

The prevalence of worms with eggs ranged from 9% to 16% for *Ascaris* spp. and 24 to 41% for *Capillaria spp.* The maximum OPG (oocysts per gram of pigeon droppings) value, indicating the intensity of invasion, was found to be 360 for *Ascaris* and 1134 for *Capillaria* (Table 1).

Coccidiosis, caused by Eimeria protozoans, is a particularly common and widespread illness among pigeons. The most frequently-observed species of Eimeria in the present study was *Eimeria labbeana*, whose extensity was found to range from 82% to 96% depending on location, with a mean infection intensity of 1130 to 1870 OPG. The mean prevalence values of the two remaining species were similar, ranging from 56–77% for *E.*

Table 1. The state of nematode infection in the tested pigeons

Tabela 1. Stopień zarażenia nicieniami badanych gołębi

Study area Badany obszar	Number of infected Liczba prób	Species of gastro-intestinal nematodes – Gatunek nicienia			
		Ascaris sp.		*Capillaria* sp.	
		prevalence prewalencja	eggs per gram współczynnik EPG	prevalence prewalencja	eggs per gram współczynnik EPG
		%	$\bar{x}$	%	$\bar{x}$
I	20	9	0–290 (128)	35	0–1134 (595)
II	20	16	0–360 (196)	41	0–489 (872)
III	20	13	0–140 (85)	24	0–923 (498)

columbarum and 32–43% for *E. columbae*, depending on the study area; interestingly, the mean OPG values were 430–1770 for the former but only 29–52 OPG for the latter (Table 2). Regarding the intensity of invasion, the maximum OPG values were 223,000 for *E. labbeana*, 54,000 for *E. columbarum* and 830 for *E. columbae*.

In addition, the tested pigeons were found to be infected with a mixture of parasites.

DISCUSSION

The diversity of intestinal parasites in bird invasions depends on many factors, such as the range of occurrence and extent of infection. They are also influenced by the accumulation of parasite eggs in the soiland the length of their virulence, during which time they present an ongoing threat to the lives of both animals and humans [Bowman 2012] .

Although many studies have been performed on the health status of free-living and aviary bird populations, only fragmentary ones have been carried out in Poland. Pigeons can be infected with many organisms, serving as reservoirs of many parasitic diseases; as such, close contact with other domestic birds is associated with a risk of parasite infestation [Piasecki 2006]. In addition, they can act as potential sources of parasitic invasions through their interactions with humans and other birds [Adang et al. 2008a, Radfar et al. 2012].

Previous studies have examined various topics associated with parasite invasion, including the associated symptoms, sources of infection and the effects of parasitism, as well as various breeding systems that may influence infection, including the introduction of preventive programs and integrated parasitic control schemes [Senlik et al. 2005, Marques et al. 2007, Radfar et al. 2011, Sood et al. 2018, Vijayakumar et al. 2018, Akram et al. 2019, Ul-Jabbar et al. 2019]. The most commonly-diagnosed nematode is *Ascaridia columbae*. It is known to cause moderate ascariasis in pigeons, manifesting mainly as removal of host nutrientsand blockage of the intestinal lumen. The second most common are those of the Capillaria family, which damage the mucous membranes by attaching to the intestinal walland secreting toxins that have a negative influence on the bird [Ledwoń and Szeleszczuk 2016].

A number of studies from different parts of the world with different environmental conditions have highlighted the high prevalence of parasitic infections. In Tenerife, infection rates by *Ascaridia columbae* were found to be as high as 40% [Foronda et al. 2004]. In Nigeria, *A. columbae* was observed in 6.25% of birds and *Capillaria* spp. in 6.95% [Mohammed et al. 2019], while in Libya, these values were 22% and 4%, respectively [Ferial et al. 2018]. In Salah Al.-Deen province, Iraq, *Ascaris* spp. were found in 12.1% of pigeons and *Eimeria* spp. in 8.1% [Ul-Jabbar et al. 2019].

Mixed invasions have also been noted. A comparative study of domestic and wild pigeons in central Anatola, Turkey, identified mixtures of coccidian oocysts in 59.6% (n = 81) of studied domestic pigeons and 30.4% (n = 35) of wild pigeons. The parasites identified were *Eimeria labbeana* (58.1% in the domestic pigeons; 28.7% in the wild pigeons), *E. columbarum* (30.9%; 10.4%), *E. columbae* (22.1%; 5.2%) and *Isospora* spp. (18.4%; 13.0%). In total, nematode eggs were observed in the droppings of 23.5% (n = 32) domestic pigeons and 4.3% (n = 5) wild pigeons. The species and the state of nematode infestation were determined: *Capillaria* spp. (19.9%), *Ascaridia columbae* (5.1%) and *Heterakis* spp. (3.7%) in domestic pigeons, and *Capillaria* spp. (4.3%) *and Syngamus* spp. (1.7%) in wild pigeons [Sari et al. 2008].

In Pakistan, the egg load of *Capillaria* spp. was examined in domestic pigeons (*Columba livia domestica*). Out of 210 *Capillaria* spp. samples tested, 154 (73.33%) demonstrated mixed infections [Malik et al. 2020]. In addition, mixed infestations have also been observed in northern Iran (*Eimeria spp.* and *Capillaria* spp.) [Sood et al. 2018], and in Pakistan: *Ascaridia spp.* 33.93%, *Capillaria* spp. 1.41%, *Hymenolepsis* spp. 6.61% and *Eimeria* spp. 67.87% [Akram et al. 2019].

However, although the breeding of carrier pigeons and decorative pigeons is very popular in Poland. there is currently no information on the parasitic infection of city pigeons in the country: most conducted research has ex-

Table 2. *Eimeria* infection of the studied pigeons by species

Tabela 2. Stopień zarażenia badanych gołębi pierwotniakami z rodzaju *Eimeria*

Study area Badany obszar	Number of infected Liczba prób	*Eimeria* species – Gatunek rodzaju *Eimeria*					
		E. labbeana		*E. columbarum*		*E. columbae*	
		prevalence prewalencja	range of infection (OPG) współ. OPG	prevalence prewalencja	range of infection (OPG) współ. OPG	prevalence prewalencja	range of infection (OPG) współ. OPG
		%	x̄	%	x̄	%	x̄
I	20	82	0–22300 (1540)	56	0–3600 (1380)	32	0–770 (37)
II	20	96	0–27000 (1870)	61	0–5400 (1770)	43	0–830 (52)
III	20	87	0–21000 (1130)	77	0–4900 (430)	27	0–550 (29)

amined the state of infestation with intestinal parasites in racing pigeon flocks. It is known that the pigeons come into contact with other birds of unknown medical status during transport to events, as well as during flights, which promotes the transmission of diseases to their own flocks.They can also become infected through contact with city pigeons [Bobrek et al. 2012].

City pigeons are known to be infected by a range of parasites. Those living in various parts of the city of Wrocław were found to harbour *Trichomonas spp.* (extensity 49.8%), *Eimeria* spp. (64.1%), *Ascaridia spp.* (30.4%), *Capillaria* spp. (48.1%) and *Raillietina* spp. (24.9%) [Piasecki 2006].

A study of intestinal parasite infection in racing pigeons in southern Poland found *Eimeria* spp. to be present in 65.7% of birds, *Ascaridia* spp. in 10%, and *Capilaria* spp. in 17.2%. The results show a generally low intensity of invasion by *Eimeria* spp.: 41.4% of samples were below 1000 OPG faeces, 17.2% of samples between 1000 and 5000 OPG and 17.2% of samples over 5000 OPG. The intensity of nematode invasion was low, not exceeding 500 OPG faeces [Bobrek et al. 2012].

A study in south-east Poland identified nematode infestation in 78.6% of ornamental pigeons and 88.8% of racing pigeons. *Eimeria* spp. dominated, being present in 59.5% of all samples, 45.4% of racing pigeons and 77.7% of ornamental pigeons (59.5% of kits); the mean OPG value was 12280 and the egg count was 7309 *Capillaria* spp. was found in 49% of all samples, 35.8% of racing pigeons and 66.6% of ornamental pigeons (52.4% of kits); the mean EPG was 3216 and the egg count was 1577. Finally, *Ascaris* spp. was found in 24.3% of all samples, 12.5% of racing pigeons and 40% of ornamental pigeons (28.6% of kits); the mean EPG was 1953 and the egg count was 474 [Tomczuk et al. 2017].

Other studies on breeding pigeons in the Pomerania region, northern Poland, found nematodes to be present in 84.2% of sampled pigeons including *Eimeria* spp. in 59.2%, *Ascaris* spp. in 12% and *Capillaria* spp. in 14% [Wysocka-Lipińska et al. 2014]. A similar level of infestation was observed in the West Pomeranian region (73.1%): infection was observed in around 91% of juvenile birds and in 59% of adults [Balicka-Ramisz and Pilarczyk 2014].

Infection with coccidia oocystsis a common problem in racing pigeons, resulting in poor performance during racing seasons and even the loss of the birds. In a flock of racing pigeons, the number of oocysts was found to fall by 2.5 to 9.9% in birds aged two to four years; however, in the parent flock, this value increased by 15.7 to 17.3% [Raś-Noryńska et al. 2011].

CONCLUSION

The obtained test results indicate a significant degree of parasite infestation in the tested pigeons. *Columba livia* forma *urbana* host various parasitic nematodes, including those of veterinary significance, and can be a significant source of infection for other avian hosts that share a common parasitic fauna. Continuation of parasitological studies is needed to ensure proper health assessment.

REFERENCES

Adang, K.L. Oniye, K.L., Ajanusi, K.L., Ezealor, A.U., Abdu, P.A. (2008a). Gastrointestinal helminths of the domestic pigeons (*Columba livia domestica* Gmelin, 1789 aves:columbidae) in Zaria, northern Nigeria. Sci. World J., 3(1), 33-37. DOI: 10.4314/swj.v3i1.51769.

Agang, K.L., Oniye, S.J., Ezealor, A.U., Abdu, P.A. Ajanusi, O.J. (2008b). Ectoparasites of Domestic Pigeon (*Columba livia domestica*, Linnaeus) in Zaria, Nigeria. Res. J. Parasitol., 3, 79–84. DOI: 10.3923/jp.2008.79.84.

Akram, M.Z., Zaman, M.A., Jalal, H., Yousaf, S., Khan, A.Y., Farooq, M.Z., Rehman, T.U., Sikandar, A., Qamar, M.F., Bowman, D.D., Hussain, T. (2019). Prevalence of gastrointestinal parasites of captive birds in Punjab. Pakistan. Pak Vet J, 39(1), 132–134. DOI: 10.29261/pakvetj/2018.123.

Balicka-Ramisz, A., Pilarczyk, B. (2014). Occurrence of coccidia infection in pigeons in amateur husbandry. Diagnosis and prevention. Ann. Parasitol., 60(2), 93–97.

Bobrek, K., Gaweł, A., Piasecki, T., Bobusia, K., Mazurkiewicz, M. (2012). Extensivness and intensity of invasion of intestinal parasites in flocks of racing pigeons in the south of Poland. Acta Sci. Pol. Med. Vet., 11(2), 3–8.

Bowman, D.D. (2020). Georgis' Parasitology for Veterinarians. Saunders (Polish edition, Edra Urban & Partner, Wrocław).

Eckert, J., Taylor, M., Licois, D., Coudret, P., Catchpole, J., Bucklar, H. (1995). Identification of *Eimeria* and *Isospora* species and strains: Morphological and biological characteristics. In: J. Eckert, R. Braun, M.W. Shirley et al. (eds) Biotechnology. Guidelines on techniques in coccidioisis research office for official publications of the European communities, Luxembourg, 103–119.

Ferial, A. Alkharigy, Adnan, S., El Naas Abdulhakim, A., Maghrbi, E.L. (2018). Survey of parasites in domestic pigeons (*Columba livia*) in Tripoli, Libya Open Vet. J., 8(4), 360–366. DOI: 10.4314/ovj.v8i4.2.

Foronda, P., Valladares, B., Rivera-Medina, J.A. (2004). Parasites of Columba livia (Aves: Columbiformes) in Tenerife (Canary Islands) and their role in the conservation biology of the Laurel pigeons. Parasitology, 1, 311–316. DOI: 10.1051/parasite/2004113311.

Frindt, A., Szeleszczuk, P., Świecki, A. (2000). Gołębie [Pigeons]. Oficyna Wydawnicza „Hoża", Warszawa [in Polish].

Helb, H.-W. (2018). Świat naszych ptaków [The world of our birds]. Wyd. Amber, Warszawa [in Polish].

Kaleta, E.F., Bolte, A.L. (2000). Prevalence and control of coccidiosis in pigeons. Prakt. Tierarzt., 81, 476–482.

Ledwoń, A., Szeleszczuk, P. (2016). Comments on the treatment of the most common endoparasitoses of the domestic pigeons. Życie Weter., 91(3), 177–182

Malik, S. Baber, M.E., Ahmad, A., Abbas, H., Zahoor, S., Rizwan, H.M., Asifand, A., Nazir, N. (2020). Prevalence of capillarianematodes of pigeons (*Columba livia domestica*) in district Narowal, Punjab, Pakistan. Pak. J. Sci., (72)1, 25–28.

Marques, S.M., De Quadros, R.M., Da Sailva, C.J., Baldo, M. (2007). Parasites of pigeons (*Columba livia*) in urban areas of Lages. S. Brazil. Parasitol. Lat. Amer., 62, 183–187. DOI: 10.4067/S0717-77122007000200014.

Mohammed, B.R.B.R., Simona, M.K., Agbedea, R.I.S., Arzaid, A.H. (2019). Prevalence of intestinal helminth parasites of pigeons (*Columba livia domestica* Gmelin 1789) in Kano State, North-Western Nigeria. Vet. Parasitol., Reg. Stud. Rep., 16:100289. DOI: 10.1016/j.vprsr.2019.100289.

Parsani, H.R., Momin, R.R., Lateef, A., Shah, N.M. (2014). Gastrointestinal helminths of pigeons (*Columba livia*) in Gujarat, India Egypt. J. Biol., 16, 63–71. DOI: 10.4314/ejb.v16i1.9.

Piasecki, T. (2006). Evaluation of urban pigeon (*Columba livia* f. *urbana*) health status in relation to their threat to human health. Med. Weter., 62, 531–536.

Radfar, M.H., Fathi, S., Asl, E.N., Dehaghi, M.M., Seghinsara, H.R. (2011). A survey of parasites of Domestic Pigeons (*Columbia livia domestica*) in South Khorasan. Iran. J. Vet. Res., 4(1), 18–23.

Radfar, M.H., Norouzi, A.E., Rezaei Seghinsara, H. (2012). Biodiversity and prevalence of parasites of domestic pigeons (*Columba livia domestica*) in a selected semiarid zone of South Khorasan, Iran. Trop. Anim. Health Prod., 44(2), 225–229. DOI: 10.1007/s11250-011-0002-3.

Raś-Noryńska, M., Michalczyk, M., Sokół, R. (2011). Coccidia infections in homing pigeons of various age during the racing season. Wiad. Parazytol., 57(3), 165–168.

Sari, B., Karatepe, B., Karatepe, M., Kara, M. (2008). Parasites of domestic (*Columba livia domestica*) and wild (*Columba livia livia*) pigeons in Niğde, Turkey. Bull. Vet. Inst. Pulawy, 52, 551–554.

Satish, S., Priti, M. (2013). Gastro intestinal Helminths parasites of local chickens samples from tribal areas of Madhya Pradesh, India. Int. J. Life Sci., 1(4), 284–287.

Senlik, B., Gulegen, E., Akyol, V. (2005). Effect of age, sex and season on the prevalence and intensity of helminth infections in domestic pigeons (*Columba Livia*) from Bursa Province, Turkey. Acta Vet. Hungarica, 53(4), 449–456. DOI: 10.1556/AVet.53.2005.4.5.

Sivajothi, S., Sudhakara, R.B. (2015). A study on the gastro intestinal parasites of domestic pigeons in YSR Kadapa District in Andhra Pradesh, India. J. Dairy Vet. Anim. Res., 2(6), 57–59. DOI: 10.15406/jdvar.2015.02.00057.

Sood, N.K, Singh, H., Kaur, S., Kumar, A., Singh, R. (2018). A note on mixed coccidian and Capillaria infection in pigeons. J. Parasitol. Dis., 42(1), 39–42. DOI: 10.1007/s12639-017-0961-z.

Tomczuk, K., Studzińska, M., Szczepaniak, K., Grzybek, M., Demkowska-Kutrzepa, M., Roczeń-Karczmarz, M., Abdulhammza Abbass, Z., Junkuszew, A., Bojar, W. (2017). Endoparasites in carrier and fancy pigeons in south-western Poland. Med. Weter., 73(11), 731–735. DOI: 10.21521/mw.5798.

Ul-Jabbar, A., Aljoburi, M.H., Jassim, N.A., Hhasan, I.I. (2019). Detection of the parasites which infect the pigeons in the Sharqat city, Salah al-Deen province. Assiut Vet. Med. J., 65, 25–30.

Vijayakumar, S., Dhandapani, K., Ravi, R. (2018). Incidence and management of parasitic diseases amongst pigeon (*Columba livia*) population. Intas. Polivet., 19(2), 354–356.

Wysocka-Lipińska, N., Chorąży, R., Tkachenko, H., Kurhaluk, N. (2014). Occurrence of parasitic diseases of pigeons *Columba livia f. domestica* in Pomeranian in the years 2008–2012. Słupskie Prace Biolog., 11, 235–249.

Balicka-Ramisz, A., Laurans, Ł., Ramisz, A., Stolbowa, E., Bal, W. (2020). Gastrointestinal helminths and coccidia infestation of city pigeons (*Columba livia* forma *urbana*) on selected monuments in Szczecin. Acta Sci. Pol. Zootechnica, 19(4), 57–62. DOI: 10.21005/asp.2020.19.4.07

NICIENIE I KOKCYDIA GOŁĘBI BYTUJĄCYCH NA WYBRANYCH ZABYTKACH W SZCZECINIE

STRESZCZENIE

Gołębie miejskie (*Columba livia forma urbana*) są wkomponowane w zurbanizowane środowisko. Interakcja gołębi z człowiekiem oraz innymi ptakami domowymi i dzikimi czyni z nich potencjalnego nosiciela pasożytów odzwierzęcych. Celem badań było ustalenie aktualnego stanu inwazjologicznego u gołębi miejskich bytujących na zabytkach Szczecina. Stada liczyły od 45 do 60 osobników i składały się z gołębi miejskich oraz przybłąkanych hodowlanych (zaopatrzonych w obrączki identyfikacyjne), które nie wróciły do swoich gołębników po lotach. Próby kałomoczu stad gołębi badano metodą flotacji, a ilościowo techniką McMaster. Badania uzupełniono o hodowlę oocyst prowadzoną w wilgotnej komorze w temperaturze 24–26°C. Jaja pasożytnicze zdiagnozowano za pomocą standardowych kluczy. Z fauny pasożytniczej zidentyfikowano w próbach kałomoczu gołębi miejskich jaja należące do dwóch jednostek taksonomicznych: dwa gatunki nicieni *Ascaridia* spp., *Capillaria* spp. oraz gatunki kokcydiów *E. labbeana*, *E. columbarum*, *E. columbae*. Ogółem ekstensywność zarażenia wynosiła około 100% i wykazywała zróżnicowanie w zależności od miejsca pochodzenia materiału. Stan zarobaczenia jajami glist *Ascaris sp.* wahał się od 9 do 16%, *Capillaria sp*. od 24 do 41%. Współczynnik OPG, określający intensywność inwazji dochodził maksymalnie przy *Ascaris* sp. do 360 a przy *Capillaria* do 1134 jaj w jednym gramie kałomoczu. Najczęściej stwierdzanym gatunkiem była *Eimeria labbeana,* którą wykazano w zależności od miejsca pochodzenia od 82 do 96%, przy średniej intensywności zarażenia od 1130 do 1870 oocyst w jednym gramie kałomoczu. Prewalencja dwóch pozostałych gatunków była również wysoka i wynosiła średnio w zależności od obszaru badanego dla: *E. columbarum* 56–77%, *E. columbae* – 32–43%. Średnie współczynniki OPG wynosiły odpowiednio 430–1770 oraz 29–52 oocyst w gramie kałomoczu. Współczynnik OPG, określający intensywność inwazji dochodził maksymalnie do 223 000 w przypadku *E.labbeana*, 54 000 w przypadku *E. columbarum* i 830 w przypadku *E. columbae.*

Słowa kluczowe: gołębie miejskie (*Columba livia forma urbana*), nicienie, kokcydia, zabytki, Szczecin

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