

## Original papers

## Gastrointestinal parasites of free-range chickens

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**ABSTRACT.** The aim of the study was to determine the prevalence and intensity of parasitic gastrointestinal infections in free-range chickens from the West Pomerania province. Experimental material for the study was taken from 10 farms. Breeds raised in farms participating in the study included miniature chickens called Polish Lilliputians and Green-legged Partridge. A total of 104 samples of faeces were examined. The Willis-Schlaff flotation method was used to assess the prevalence of infection, and McMaster's method to evaluate the intensity. The presence of gastrointestinal parasites was found in 9 of the 10 farms. Oocysts of the genus *Eimeria* and eggs of gastrointestinal nematodes *Ascaridia galli*, *Heterakis gallinarum* and *Trichostrongylus tenuis* were isolated from the chicken faeces. Coccidiosis was found to be dominant parasitosis. The prevalence of infections on these farms with protozoa of *Eimeria* spp. was on average 32.7%, while for nematode species they amounted to 9.6% for *Ascaridia galli*, 5.7% for *Heterakis gallinarum* and 12.5% for *Trichostrongylus tenuis*. The results indicate the need to take preventive measures, designed to eliminate/reduce the risk of parasitoses in poultry from free-range systems. Focus should be placed on the hygiene of the farming conditions.

**Key words:** poultry, *Eimeria*, *Ascaridia galli*, *Heterakis gallinarum*, *Trichostrongylus tenuis*

### Introduction

The health of free-range poultry depends on several factors. The continuous presence of birds in the same area favors the occurrence of parasitic diseases [1]. Although there are many agents available on the market preventing parasitic infections, the problem is still present in small flocks. The most common diseases in chickens are coccidiosis and helminthiasis. Gawęcka [2] reports a higher mortality among free-range chickens compared with chickens kept in closed poultry houses.

Chickens kept in free-range systems are generally not covered by the prophylactic program against parasitic diseases. In addition, farmers may resign from complete compound feeds and replace them with feeds from the farm [3], which adversely affects the immune system. The losses incurred by growers due to parasitic diseases result from reduced gains in the body weight of the birds and worse feed conversion ratio, and in extreme cases

elevated mortality [4]. Parasitosis should not be neglected, as they have an adverse effect on the health of the animals, thus resulting in their underperformance [5].

The aim of the study was to determine the prevalence and intensity of parasitic gastrointestinal infections in free-range chickens from the West Pomerania province.

### Materials and Methods

Experimental material for the study consisted of the faeces of chickens from 10 farms from the West Pomerania province. A description of the maintenance conditions of birds and the dates of testing in individual farms are presented in Table 1.

The chickens were kept in free-range systems (extensive) in all farms. They were bred alone or together with ducks. The chickens were fed with feed intended for laying hens as well as bread, potatoes, kitchen waste and grass, to which they had unlimited access. The ranges were equipped with

Table 1. Description of the farming conditions of birds and the dates of testing in individual farms

Farm	n	Date of test	Feeding	Other
A	14	Autumn	Prepared feed, kitchen waste	Non-dewormed, limited range
B	5	Autumn	Prepared feed, kitchen waste	Non-dewormed, limited range
C	10	Autumn	Prepared feed, kitchen waste	Non-dewormed, unlimited range
D	10	Autumn	Barley, wheat, oats	Non-dewormed, limited range, chickens kept with ducks
E	10	Autumn	Prepared feed, kitchen waste	Non-dewormed, limited range
F	10	Autumn	Prepared feed, kitchen waste, boiled potatoes	Non-dewormed, limited range
G	10	Autumn	Barley, wheat, kitchen waste	Non-dewormed, unlimited range, chickens kept with ducks
H	10	Spring	Prepared feed, kitchen waste, boiled potatoes	Non-dewormed, limited range
I	10	Spring	Prepared feed, kitchen waste	Non-dewormed, limited range, chickens kept with ducks
J	15	Spring	Prepared feed, kitchen waste	Non-dewormed, unlimited range, partly in the fore

drinkers which provided the hens with a constant access to fresh water. All birds had the possibility to take refuge in the event of adverse weather conditions. Hay was used as bedding in poultry houses. Breeds raised in farms participating in the study included miniature chickens called Polish Lilliputians and Green-legged Partridge. A total of 104 faeces samples were examined. The Willis-Schlaff flotation method was used to assess the prevalence of infection and McMaster's method was used to evaluate the intensity [6,7].

## Results and Discussion

The analysis of the results obtained from individual farms revealed that the composition of the parasitic fauna within the gastrointestinal tract of the chickens and the prevalence of infection varied between farms (Table 2). Internal parasites were found to be present in chickens from 9 of the 10 farms investigated. Single invasions occurred in animals from 8 farms: the oocysts of *Eimeria* spp. were isolated from the faeces of chickens from 5 farms, and the eggs of *Trichostrongylus tenuis* from 2 farms. Mixed invasions were noted in chickens from the 2 other farms. In addition to coccidia, nematodes also occurred in these chickens. It was observed that coccidiosis was the dominant

parasitosis (Fig. 1). In addition to the isolation of protozoa from the faeces of animals tested, eggs of *Ascaridia galli*, *Heterakis gallinarum* and *Trichostrongylus tenuis* were also isolated.

Most frequently identified species of coccidia in poultry were *Eimeria acervulina*, *Eimeria tenella* and *Eimeria maxima* [8]. Balicka-Ramis et al. [9], in a study conducted in the former province of Szczecin, detected the presence of *E. acervulina*, *E. mitis*, *E. mivati*, *E. maxima*, *E. necatrix*, *E. tenella* and *E. brunetti* in chickens. Mazurkiewicz [10] reported the occurrence of *Eimeria acervulina*, *E. brunetti*, *E. maxima*, *E. mitis*, *E. mivati*, *E. necatrix*, *E. tevnella*, in poultry from Lower Silesia, the following species being the most common: *E. maxima* – 88.2%, *E. acervulina* – 45.8%, and *E. mivati* – 32.9%. Graat et al. [11] studied 4774 flocks of broilers in The Netherlands and found that 63% of them had coccidiosis. The following species were isolated most frequently from faeces: *E. acervulina* – 55%, *E. tenella* – 31% and *E. maxima* – 10%. Permin et al. [12] note the occurrence of *Eimeria* spp. in 36% of mature chickens and 47% juveniles, while the nematode *Heterakis gallinarum* was isolated from 64% of birds tested.

One of the most commonly occurring nematodes in chickens is *Ascaridia galli*. The study conducted

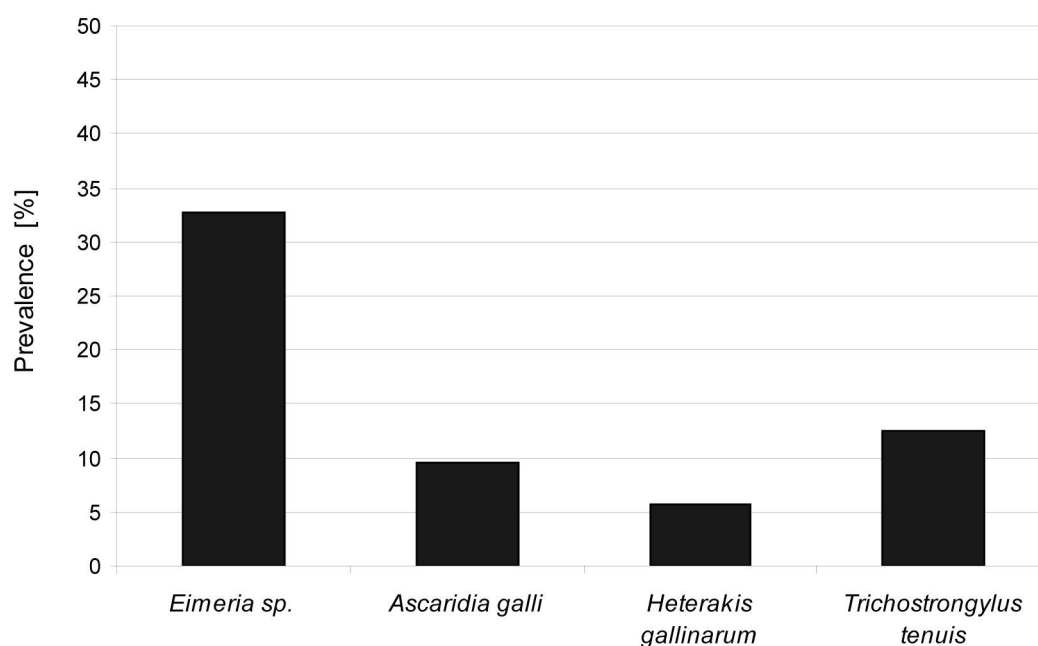


Fig. 1. The average prevalence of infections with gastrointestinal parasites in chickens tested

by Szelażewicz and Raymund [13] showed the occurrence of *Ascaridia galli* in 17% of tested backyard chickens. However, the average prevalence of *A. galli* infection observed in free-range chickens in the present study was almost half this, amounting to 9.6% (Fig. 1). Our findings also demonstrate that only 2 of the 10 farms revealed the presence of ascaridiosis (Table 2), and the intensity of infection was low (Table 3). Studies conducted in Denmark showed that *Ascaridia galli* nematodes were found in 5% of chickens from farms with a cage system. However, in the farms where birds had access to ranges, greater diversity of parasitic species was observed, and the percentage of infected birds was significantly higher. In the case of free-range systems, *Ascaridia galli* was identified in 63.8% of birds [14]. Martin-Pacho et al. [15] reported that the infection with *Ascaridia galli* was found in chickens from 5 out of 7 free-range farms

tested. Magwisha et al. [16], in a study conducted in Tanzania in free-range farms, found that from 29 to 69% of chickens were infected with *Ascaridia galli*.

A German study shows that free-range chickens at the end of the laying period had greater intensity of infection with *Ascaridia galli* and *Heterakis gallinarum* compared to hens kept in closed poultry houses (cited after Gawęcka [2]). A parasitological study carried out by Szelażewicz and Raymund [13] showed an invasion of *Heterakis gallinarum* in 9% of chickens. The present study demonstrated that only 5.7% of all examined birds were infected with this parasite. The prevalence of infection was significantly lower than that reported by Permin et al. [14], who found that 72.5% of birds were infected with *Heterakis gallinarum* in the free-range systems, and 68.8% in the backyard system. Moreover, Magwisha et al. [16] report a high prevalence of infection in farms with free ranges

Table 2. The prevalence of infections with parasites of the gastrointestinal tract in individual farms

Parasite	Farm									
	A	B	C	D	E	F	G	H	I	J
<i>Eimeria spp.</i>	85%	nf	20%	30%	nf	nf	30%	60%	50%	20%
<i>Ascaridia galli</i>	57%	nf	nf	nf	nf	nf	nf	nf	20%	nf
<i>Heterakis gallinarum</i>	43%	nf	nf	nf	nf	nf	nf	nf	nf	nf
<i>Trichostrongylus tenuis</i>	50%	80%	nf	nf	nf	20%	nf	nf	nf	nf

nf - not found

Table 3. The intensity of infections (oocyst or eggs per gram faeces) with parasites of the gastrointestinal tract in individual farms

Parasite	Farm									
	A	B	C	D	E	F	G	H	I	J
<i>Eimeria</i> spp.	650	nf	150	100	nf	nf	100	150	200	100
<i>Ascaridia galli</i>	150	nf	nf	nf	nf	nf	nf	nf	150	nf
<i>Heterakis gallinarum</i>	100	nf	nf	nf	nf	nf	nf	nf	nf	nf
<i>Trichostrongylus tenuis</i>	150	150	nf	nf	nf	100	nf	nf	nf	nf

nf - not found

amounting to 84–89%. The results of the current study indicate that this parasite occurred only in chickens from one farm (A), and single eggs were observed in the faeces.

## Conclusions

Keeping birds in free-range system while failing to provide preventive measures may favor the occurrence of parasitic diseases. In 9 out of 10 farms included in the study, the presence of gastrointestinal parasites such as protozoa of the genus *Eimeria* and the gastrointestinal nematodes *Ascaridia galli*, *Heterakis gallinarum* and *Trichostrongylus tenuis* was noted. The prevalence of infection in the farms with *Eimeria* ranged from 20% to 85%, *Ascaridia galli* from 20% to 57%, *Heterakis gallinarum* 43% and *Trichostrongylus tenuis* from 20% to 80%. The results highlight the need to take preventive measures designed to eliminate or reduce the risk of parasitosis in poultry from free-range systems. The main focus should be placed on the hygiene of the farming conditions.

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