

## Original papers

## New records of nematodes of passerine migratory birds

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**ABSTRACT.** Parasitological examination of three passerine bird species: the Red-backed Shrike *Lanius collurio*, Eurasian Golden Oriole *Oriolus oriolus* and Yellow Wagtail *Motacilla flava*, revealed the presence of the nematodes *Acuaria subula*, *Diplotriaeana ozouxi*, *Viguiera euryoptera* and *Microtetrameres inermis*. All the birds were obtained in the spring (April–May); the nematodes found were mature, which indicates infection in the hosts' wintering grounds. The gizzard worm *Acuaria subula* is a new record from *Motacilla flava* in Europe. *Viguiera euryoptera* and *Diplotriaeana ozouxi* are new to the Polish fauna.

**Key words:** Nematoda, *Viguiera euryoptera*, *Microtetrameres inermis*, *Diplotriaeana ozouxi*, *Acuaria subula*, new record, passerine birds

## Introduction

Passeriformes have 354 representatives in Europe (according to the Fauna Europaea) and 166 in Poland, including the fleeting and penetrating species. Some of them are rare and almost all are protected, so their internal parasites are not well known. Most parasitological studies deal with specimens of commonly occurring nesting birds, found dead, or those which died during migration; they often apply to single individuals.

According to the literature data, 125 nematode species have been recorded from birds nesting in Poland; 44 (35.5%) of these species are found in Passeriformes [1–3]. The number is comparable to those recorded from adjacent countries (Table 1).

The number of parasitologically examined passerine bird species is higher than the number of parasite-bearing species, since not all the birds carried nematodes. In Poland, over the years, no helminths have been found in some birds, including those of the genera *Anthus* and *Emberiza*, as well as *Certhia familiaris*, *Sitta europaea*, or *Chloris chloris* (own, unpublished results). Similarly, Frantova's parasitological section [7] of 220 specimens of *Carduelis*, *Parus*, *Passer*, *Sitta* and *Sylvia* from the Czech Republic revealed no nematode infection in any of them. However, coprological examination of 415 birds of 34

passerine species caught in Hungary and Italy (1998–2001) revealed nematode eggs only in 27 (6.5%). The uninfected birds included, among others, *Fringilla coelebs*, *Passer montanus*, *Phylloscopus sibilatrix* and *Luscinia megarhynchos* [8].

Also in Poland, with its large populations of commonly occurring birds whose diet consists mainly of seeds and fruit, nematode infections are rarely observed. For example, only one species of the intestinal nematode *Baruscapillaria angusta* was found in a study of the Chaffinch *Fringilla coelebs* (385 birds examined) and the House Sparrow *Passer domesticus* (273 examined), the

Table 1. Distribution of nematodes in passerine species

Location	Number of passerine species infected with nematodes	Number of nematode species	Source
Kaliningrad Region	42	34	[4]
Lithuania, Latvia, Estonia, Kaliningrad Region	45	38	[5]
Poland	36	44	[1,2]
Czech and Slovak Republics	50	41	[6]

intensities being 1 and 3 specimens, respectively [9]. In addition, the flycatchers, the Muscicapidae, whose contact with the soil is limited and which generally feed in flight, rarely experience helminth infection: among the 121 examined birds only 11 (9.1%) were nematode-infected [10]. The nematodes were *Diplotrriaena tridens* and *Microtetrameres inermis*, whose intermediate hosts are Orthoptera, and *Hadjelia truncata*, whose larval forms are found in beetles [11]. Another mode of infection of Turdidae and Paridae with nematodes of the superfamily Filarioidea (e. g. *Cardiofilaria pavlovskyi* and *Eufilaria delicata*) is the transmission of microfilariae by blood-sucking flies. These nematodes were found in birds only in the spring, after their return from the wintering grounds in south-western Europe. The birds, which largely feed on invertebrates, and are often paratenic or intermediate hosts of nematodes, are often heavily infected with numerous species of nematodes. For example, 19 nematode species were recorded from the Starling, *Sturnus vulgaris*, and 12 from the Blackbird, *Turdus merula*, in Poland. Among them was a capillariid, *Baruscapillaria ovopunctata*, with a maximum intensity in the intestine of a female Blackbird as high as 1 290 specimens [1].

## Materials and Methods

The author's helminthological collection of Passeriformes, obtained during a comprehensive study of the parasite fauna of birds of Lower Silesia, conducted since the 1970s, contained unidentified alcohol-preserved and glycerol-cleared nematodes. The nematodes were obtained from fairly rare birds: the Red-backed Shrike *Lanius collurio* (2 infected), Eurasian Golden Oriole *Oriolus oriolus* (1 infected) and Yellow Wagtail *Motacilla flava* (9 infected). All the birds were adult, obtained in the spring months (April–May).

## Results

Four nematode species were identified in the infected birds: *Viguiera euryoptera* (Rud., 1819) in *Lanius collurio*; *Diplotrriaena ozouxi* Railliet et Henry, 1909 and *Acuaria subula* (Duj., 1845) in *Motacilla flava*, and *Microtetrameres inermis* (Linst., 1879) in *Oriolus oriolus* and *M. flava*.  
***Viguiera euryoptera*** (Habronematidae)  
 Host: *Lanius collurio* (2 ad.) – (IV,V)  
 Site: glandular stomach

Intensity: 1–19 specimens

Material: 19 specimens (12 females and 6 males); and 1 (female)

A specific parasite of *Lanius* birds: *L. collurio*, *L. minor*, *L. excubitor*, *L. cristatus*, *L. rufus*, *L. vittatus* in Europe (Bulgaria, Slovak Republic, Germany, Ukraine, Kaliningrad Region), Asia, Africa

Life cycle: unknown

First record from Poland.

***Diplotrriaena ozouxi*** (Diplotrriaenidae)

Host: *Motacilla flava* (5 ad.) – (IV-V)

Site: air sacs

Intensity: 1–6 specimens

Material: 1, 1, 3, 5, 6 nematodes (10 females, 6 males)

A specific parasite of Passeriformes (e.g. *Motacilla alba*, *M. flava*, *Oenanthe oenanthe*, *Oriolus oriolus*) in Europe (Bulgaria, Czech Republic, France, Kaliningrad Region, Latvia, Spain), Africa, North and South America, Asia. The species was described from *Foundia madagascariensis* in Madagascar.

Life cycle: unknown

First record from Poland.

***Acuaria subula*** (Acuariidae)

Host: *Motacilla flava* (1 ad.) – (V)

Site: under cuticle of gizzard

Intensity: 1

Material: 1 female

Recorded from Passeriformes of the genera *Acrocephalus*, *Anthus*, *Erithacus*, *Ficedula*, *Hippolais*, *Luscinia*, *Motacilla*, *Muscicapa*, *Passer*, *Phylloscopus*, *Saxicola*, *Sitta*, *Sturnus*, and *Sylvia* in Europe (British Isles, Czech Republic, Slovak Republic, France, Kaliningrad Region, Moldova, Ukraine, Poland, Russia); known also from Asia. In *Motacilla flava* noted only from the Black and Caspian coast part of Russia [12].

In Poland: *Acrocephalus scirpaceus*, *Erithacus rubecula*, *Ficedula hypoleuca*, *Hippolais icterina*, *Passer domesticus*, *Phylloscopus trochiloides*, *Sturnus vulgaris*

Life cycle: probably indirect. Third-stage larvae were found in the desert locust *Schistocerca gregaria* (exp.) [13].

The record of *A. subula* in *Motacilla flava* from Poland is the first such record in Europe.

***Microtetrameres inermis*** (Tetrameridae)

Host: *Oriolus oriolus* (1 ad. male) – (V); *Motacilla flava* (3 ad.) (IV–V)

Site: proventriculus (glandular stomach)

Intensity: 10; 1–21 specimens

Material: 30 females and 3 males

A parasite of Passeriformes (e.g. *Motacilla flava*, *Oriolus oriolus*) in Europe (Czech Republic, Kaliningrad Region, Moldova, Russia, Ukraine), Asia and Africa. In Poland recorded so far from *Acrocephalus scirpaceus*, *Corvus cornix*, *C. frugilegus*, *Hippolais icterina* and *Sylvia atricapilla*. The presence of the parasite in adult birds during the spring months (April–June) indicates its southern origin [4].

Life cycle: indirect; intermediate hosts are orthopterans – *Tylotropidius* and *Locusta migratoria* [11].

First record in Poland in *M. flava* and *O. oriolus*.

## Discussion

All the recorded nematode species (*V. euryoptera*, *D. ozouxi*, *A. subula*, *M. inermis*) represent the order Spirurida and are specific to passerine migratory birds. *V. euryoptera* shows a strict specialisation: it is found only in birds of the genus *Lanius*. The main food of the examined birds (*Motacilla flava*, *Lanius collurio*, *Oriolus oriolus*) are insects and their larvae which are sometimes intermediate hosts of nematodes. The birds are thought to have become infected in their wintering grounds, because after arrival in the spring (April and May), they were found to carry only adult nematodes. This is in agreement with earlier studies by Yygis [4] in the vicinity of Kaliningrad.

The literature data shows that birds of the family Motacillidae are not often infected with nematodes. For example, according to Yygis [4], only 22.9% of the birds caught in the vicinity of Kaliningrad were infected, while Frantova [7] did not find any nematodes in 6 examined *Motacilla alba*. *Diplotriaeana ozouxi* is a rare parasite in central Europe. According to Yygis [4] it occurred in 1 of 26 (3.8%) *Motacilla flava* and in 1 of 87 (1.15%) *M. alba*. Among the large number of nematodes recorded from the Czech Republic there was only one individual from *Motacilla alba* and one from *M. flava* [6]. *D. ozouxi*, of still unknown life cycle, is observed in birds worldwide. Probably, like other members of the genus *Diplotriaeana*, its life cycle involves intermediate hosts – grasshoppers or locusts. According to the present author's own observations and Yygis's [4] results, birds from central and eastern Europe are likely to become infected with this parasite in their wintering grounds, since they were found to carry only adult

nematodes (females with eggs) upon their return in the spring (April and May). Typically, the intensity of nematode invasion was low, up to 7 individuals, which is probably due to their large parasitological size (females up to 62 mm in length).

The literature suggests that *M. inermis* is found rather often; for example, in 5 out of 20 specimens of *M. flava* examined [4]. However, the presence of *M. inermis* in *Oriolus oriolus* is listed only in Global host-parasite species [14].

*Viguiera euryoptera* is specific to birds of the family Laniidae [15,16]. In the Kaliningrad Region it was recorded in May in 6 out of 14 individuals of *Lanius collurio* [4]; the intensity being 1–7 specimens. In the author's own material, the intensity was high: 19 individuals, and mature females reached a length of 11 mm.

*Acuaria subula* is characteristic of small Passeriformes, and in Poland it has been recorded in several species of birds [1,3]. The species was previously found in *M. flava* only in the Asian part of Russia [12]. In eastern Europe it has so far been recorded in the White Wagtail, *M. alba*: a related host species [4,5].

This is the first record of *Acuaria subula* from *Motacilla flava* in Europe; *Viguiera euryoptera* and *Diplotriaeana ozouxi* are new to the Polish fauna. Additionally, *Microtetrameres inermis* is recorded for the first time from *M. flava* and *Oriolus oriolus* in Poland.

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