Acta Soc. Zool. Bohem. **66**: 13–28, 2002
ISSN 1211-376X

Some parasitic nematodes (Nematoda) of birds (Aves) in the Czech Republic

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Received October 5, 2000; accepted October 16, 2001
Published April 3, 2002

Abstract. More than 600 birds belonging to 50 species and 8 orders, coming mostly from southern Bohemia in the Czech Republic, were dissected during 1977–1983 and 1999. Parasitic nematodes seemed to be more prevalent in carnivorous than herbivorous birds. Thirteen species of birds of the orders Falconiformes, Charadriiformes (*Larus ridibundus* Linnaeus, 1766), Passeriformes and Pelecaniformes (*Phalacrocorax carbo* Linnaeus, 1758) were infected with 20 nematode species: Capillariidae (11 species), Ascarididae (3), Syngamidae (2), Acuariidae (2), Anisakidae (1) and Aproctidae (1). The occurrence of some rare species (*Aonchotheca longifilla* (Dujardin, 1845), *Baruscapillaria carbonis* (Dubinin et Dubinina, 1940), *Capillaria* cf. *tenuissima* (Rudolphi, 1809), *Cosmocephalus obvelatus* (Creplin, 1825) was recorded. Detailed descriptions of *Aonchotheca exilis* (Dujardin, 1845) and *A. longifilla* are given. *Baruscapillaria carbonis* from *Phalacrocorax carbo* is new for the nematofauna of the Czech Republic. Parasites of the genus *Aonchotheca* (López-Neyra, 1947) were recorded from *Fringilla coelebs* for the first time.

Distribution, morphology, nematode, parasite, Aves, Falconiformes, *Fringilla coelebs*, *Larus ridibundus*, *Phalacrocorax carbo*, Palaearctic region

INTRODUCTION

Extensive faunistical studies of parasitic nematodes (Nematoda) of birds in the Czech Republic were carried out mainly from 60's until 70's of the 20th century. The nematofauna of Falconiformes was studied by Tenora & Lusk (1960), Škarda (1964), Baruš (1964, 1966) and Michálek (1984). Results of extensive surveys on Charadriiformes were published by Baruš et al. (1978) and Bušta et al. (1985). Data on the nematodes of Passeriformes are rather scarce (Ryšavý 1955, 1957, Zavadil 1955, Škarda 1964, Baruš 1970a, b, Baruš et al. 1972, Koubek & Vojtek 1973, Sonin & Baruš 1971). The helminth fauna of *Phalacrocorax carbo* (Pelecaniformes) was not studied in the Czech Republic until 80's because of the rarety occurence of the host. Due to strict protection, the European cormorant population has grown and colonized to new nest sites (Hudec et al. 1994). From the beginning of 80's *P. carbo* has regularly nested in the Czech Republic and shooting by fishermen has made it possible to study the helminth fauna of this species. There are several papers on its nematode parasites (Moravec et al. 1988, 1994, Moravec 1990).

The present study is based on an examination of birds, carried out mainly by J. Michálek and J. Bušta from the Institute of Parasitology, Academy of Sciences of the Czech Republic (ASCR) in Praha, in 1977–1983, partly by the author in 1999. This revealed the presence of parasitic nematodes in 13 species belonging to the orders Falconiformes, Charadriiformes, Passeriformes and Pelecaniformes. Taxonomic evaluations were made of the rare species of nematodes and those inadequately described.

Tab. 1. List of the birds examined for the presence of nematodes during 1977–1983 and 1999 (the nomenclature taken from Hudec 1977, 1983, 1994)

order, species of host	examined / infected	order, species of host	examined / infected
Falconiformes		**Passeriformes**	
Accipiter gentilis	14 / 7	*Ficedula hypoleuca*	1 / 0
Accipiter nisus	11 / 2	*Fringilla coelebs*	17 / 2
Buteo buteo	69 / 15	*Fringilla montifringilla*	2 / 0
Strigiformes		*Hirundo rustica*	3 / 0
Asio flammeus	1 / 0	*Loxia curvirostra*	6 / 0
Asio otus	2 / 0	*Motacilla alba*	6 / 0
Bubo bubo	1 / 0	*Oriolus oriolus*	2 / 0
Charadriiformes		*Parus ater*	2 / 0
Larus ridibundus	?* / 125	*Parus caeruleus*	14 / 0
Gruiformes		*Parus cristatus*	1 / 0
Fulica atra	1 / 0	*Parus major*	37 / 0
Piciformes		*Passer domesticus*	72 / 0
Dendrocopos major	3 / 0	*Passer montanus*	18 / 0
Coraciiformes		*Phoenicurus ochruros*	3 / 0
Alcedo atthis	1 / 0	*Phoenicurus phoenicurus*	2 / 0
Pelecaniformes		*Phylloscopus collybita*	5 / 0
Phalacrocorax carbo	2 / 2	*Prunella modularis*	7 / 1
Passeriformes		*Pyrrhula pyrrhula*	6 / 0
Aegithalos caudatus	5 / 0	*Regulus regulus*	3 / 0
Acrocephalus scirpaceus	1 / 0	*Riparia riparia*	7 / 0
Carduelis carduelis	8 / 0	*Serinus serinus*	1 / 0
Carduelis chloris	27 / 0	*Sitta europaea*	11 / 0
Carduelis spinus	18 / 0	*Sylvia atricapilla*	16 / 0
Corvus corone	1 / 1	*Sylvia curruca*	3 / 0
Corvus frugilegus	15 / 9	*Troglodytes troglodytes*	1 / 0
Corvus monedula	3 / 2	*Turdus merula*	42 / 13
Emberiza citrinella	1 / 0	*Turdus philomelos*	13 / 9
Erithacus rubecula	19 / 2	*Turdus pilaris*	2 / 0
Ficedula albicollis	7 / 0		

*exact no. examined unknown

MATERIALS AND METHODS

The previously unevaluated material in the collection of the Institute of Parasitology, ASCR, in České Budějovice, obtained in 1977–1983, and that newly collected by the author in 1999, includes nematodes recovered from more than 600 birds belonging to 50 species and 8 orders (Tab. 1). The birds were collected in localities in South Bohemia (the regions of České Budějovice, Český Krumlov, Humpolec, Písek, Strakonice, Tábor and Třeboň), Praha and Litomyšl, at different times of year. Nematodes were fixed and stored in 4% formaldehyde and cleared in glycerine prior to examination. Drawings were made with the aid of a Zeiss microscope drawing attachment. After examination, the nematodes were transferred to 70% ethanol and deposited in the helminthological collection of the Institute of Parasitology, ASCR, in České Budějovice. All measurements are in millimetres.

RESULTS AND DISCUSSION

Parasitic nematodes were found in 13 species of birds of 50 examined (Tab. 2). All of the infected birds are carnivorous, or omnivorous at some time in a year. In spite of relatively high numbers of specimens examined, no parasitic nematodes were found in birds that are clearly or predominantly herbivorous (*Carduelis chloris*, *C. spinus*, *Parus major*, *P. caeruleus*, *Passer domesticus*, *P. montanus*, *Sitta europaea*, *Sylvia atricapilla*).

Twenty species of nematodes were recorded. Most of the nematodes were recovered from the digestive tract, three species (*Cyathostoma lari*, *Syngamus merulae* and *Aprocta cylindrica*) from the respiratory tract. *Larus ridibundus* and *Turdus merula* harboured the highest number (5) species of nematodes.

SURVEY OF SPECIES

Family Capillariidae Railliet, 1915

Aonchotheca exilis (Dujardin, 1845) Freitas et Medonça, 1961
(Fig. 1, Tab. 3)

HOSTS. *Turdus merula*, *T. philomelos*.
PREVALENCE AND INTENSITY. *T. merula*: 23 examined / 1infected, 3 specimens; *T. philomelos*: 13/4, 1–7 specimens.
SITE. Small intestine.
LOCALITIES. Humpolec (July 1978), Praha (June 1978).
DESCRIPTION. Body white, medium-sized. Two lateral bacillary bands. Stichosome formed by single row of stichocytes provided with large nuclei (Figs 1A, B); stichocytes subdivided into 7–10 annuli. Two medium-sized oval glandular cells present at oesophago-intestinal junction (Fig. 1C).

Male (8 specimens): Spicule long, flexible, well sclerotized (Figs 1J, K); its proximal end reflexed, bluntly rounded (Fig. 1K), distal end sharply pointed (Fig. 1J). Spicular sheath without spines (Fig. 1D). Caudal lateral alae present (Figs 1H, I). Membranous bursa reduced, closely surrounding caudal end of body; supported by one dorsomedian and two ventrolateral projections, each of the latter bearing papila (Figs 1H, I). Cloacal opening subterminal.

Female (12 gravid specimens, one nongravid): Vulva slightly posterior to level of oesophago-intestinal junction (Fig. 1C). Small rounded vulvar appendage present in 9 of 12 gravid, but absent

Tab. 2. List of the nematode species found in each infected species of bird

order, species of host	species of nematode	order, species of host	species of nematode
Falconiformes		**Passeriformes**	
Accpiter gentilis	*Baruscapillaria* cf. *falconis*	*Corvus corone*	*Eucoleus contortus*
	Eucoleus cf. *dispar*	*Corvus frugilegus*	*Acuaria anthuris*
	Porrocaecum depressum		*Baruscapillaria resecta*
Accipiter nisus	*Capillaria* cf. *tenuissima*	*Corvus monedula*	*Baruscapillaria resecta*
	Porrocaecum depressum	*Erithacus rubecula*	*Aprocta cylindrica*
Buteo buteo	*Baruscapillaria falconis*	*Fringilla coelebs*	*Aonchotheca* sp.**
	Porrocaecum depressum		Capillariidae gen. sp.
Charadriiformes		*Prunella modularis*	*Aonchotheca longifilla*
Larus ridibundus	*Eucoleus contortus*	*Turdus merula*	*Aonchotheca exilis*
	Cosmocephalus obvelatus		*Baruscapillaria ovopunctata*
	Cyathostoma lari		*Porrocaecum ensicaudatum*
	Porrocaecum ensicaudatum		*Porrocaecum semiteres*
	Porrocaecum semiteres		*Syngamus merulae*
Pelecaniformes		*Turdus philomelos*	*Aonchotheca exilis*
Phalacrocorax carbo	*Baruscapillaria carbonis**		*Porrocaecum ensicaudatum*
	Contracaecum rudolphii		*Porrocaecum semiteres*

* first record from the Czech Republic
** first record of the parasites of genus *Aonchotheca* from *Fringilla coelebs*

in nongravid females. Eggs oval, thick-walled, with prominent striation on surface (Figs 1F, G). Content of mature eggs uncleaved. Anus subterminal (Fig. 1E).

COMMENTS. This is a parasite of Passeriformes, especially Turdidae (Wakelin 1966, Okulewicz 1979b). Baruš & Sergeeva (1990b) stress the absence of the vulvar appendage in the descriptions of this species by Dujardin (1845) and López-Neyra (1947) (also Eberth 1863, Boyd 1951) and consider it to be the main distinguishing feature. They doubt the species determinations of the authors who reported the presence of this structure in female *A. exilis* (Mettrick 1959, Wakelin 1966, Baruš & Daniel 1976, Okulewicz 1979a). Wakelin (1966) recorded the presence of the vulvar appendage in all of 380 female specimens. Okulewicz (1979a) found this structure in 85.2% gravid and 7.2% nongravid females. Nine of the twelve gravid females in the present study had a vulval appendage; but it was absent from the nongravid female. In my opinion, the presence or absence of the vulvar appendage is not a reliable feature for distinguishing of *A. exilis*. The structure of the caudal end of body, of the spicular sheath and the shape of the distal end of the spicule in males as well as the striated surface of the eggs in females are typical of this species and, therefore, useful for determination.

Aonchotheca longifilla (Dujardin, 1845) Baruš et Sergeeva, 1990

(Fig. 2, Tab. 4)

HOST. *Prunella modularis*.

PREVALENCE AND INTENSITY. 7 examined / 1 infected, 3 specimens.

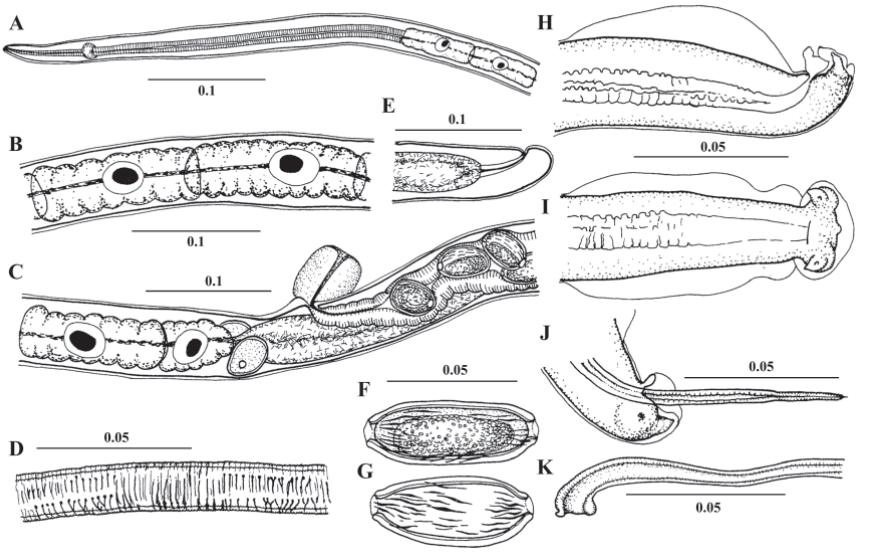

Fig. 1. *Aonchotheca exilis* (Dujardin) from *Turdus philomelos* (Cat. No. N-229). A – anterior end; B – stichocytes; C – vulva region; D – spicular sheath; F, G – eggs; H, I – caudal end of male, lateral and ventral views; J – distal end of spicule; K – proximal end of spicule. Scale bars in mm.

Tab. 3. Measurements (mm) of *Aochotheca exilis* (Dujardin) from *Turdus merula* and *T. philomelos*. Published data after Okulewicz (1979a)

author	males published data	present study	females published data	present study
length of body	3.07–18.12	10.56–18.34	9.17–23.83	12.16–18.75
width of body	0.038–0.086	0.050–0.057	0.054–0.113	0.050–0.083
width of lateral bacillary bands	–	–	–	0.028–0.033
nerve ring – anterior	–	0.076–0.101	–	0.088–0.139
length of entire oesophagus	2.214–8.625	3.71–8.29	4.03–9.45	5.58–7.17
length of stichosome	–	3.40–7.90	–	5.30–6.71
number of stichocytes	44–60	50–57	49–60	44–64
length of spicule	1.39–2.71	1.109–1.562		
width of spicule	0.004–0.008	–		
distal end of spicule	sharp	sharp		
bursa: length		0.010–0.018		
bursa: width	0.027–0.035	0.018–0.025		
vulva – anterior			–	5.22–7.17
length of vulvar appendage			0.023–0.081	0.043–0.050
egg: length			0.049–0.065	0.050–0.063
egg: width			0.020–0.032	0.023–0.030

SITE. Small intestine.

LOCALITY. Praha (September 1978).

DESCRIPTION. Body white, medium-sized. Two lateral bacillary bands present. Stichosome formed by single row of stichocytes provided with large nuclei (Figs 2A, B). Two medium-sized wing-like glandular cells present at oesophago-intestinal junction (Fig. 2B).

Male (1 specimen): Spicule long, flexible, well sclerotized, slightly expanded and reflexed at proximal end (Fig. 2I), rounded at distal end (Fig. 2J). Spicular sheath smooth, transversely striated

Tab. 4. Measurements (mm) of *Aonchotheca longifilla* (Dujardin, 1845) from *Prunella modularis* (the present study) and *P. modularis* and *Alauda arvensis* (Baruš 1970a)

author	males Baruš (1970a)	present study	females Baruš (1970a)	present study
number of specimens	4	1	7	1
length of body	10.30–12.41	9.06	17.52–19.71	10.88
width of body	0.058–0.065	0.044	0.080–0.087	0.063
width of lateral bacillary bands	–	0.013	–	0.027
nerve ring – anterior	–	0.088	–	0.076
length of entire oesophagus	3.90–4.20	3.90	5.67–5.84	4.35
length of stichosome	–	3.46	4.7–5.2	3.83
number of stichocytes	40–41	42	43	39
length of spicule	1.48–1.89	1.449		
width of proximal end of spicule	0.014–0.017	0.013		
width of distal end of spicule	–	0.005		
bursa: length	0.023–0.029	0.013		
bursa: width	0.033	0.020		
vulva – anterior			5.74–5.92	4.42
egg: length			0.053–0.058	0.053–0.058
egg: width			0.023–0.030	0.023–0.025

(Fig. 2E). Caudal lateral alae present (Figs 2D, E, F). Membranous bursa small and round, supported by two lateroventral projections, each bearing papila (Figs 2D, F). Cloacal opening subterminal.

Female (1 gravid specimen). Vulva slightly posterior to level of oesophago-intestinal junction (Fig. 2B). Vulvar appendage absent. Longitudinal cuticular crests present, one above and one below vulva (Fig. 2B). Eggs with indistinct striation on surface (Figs 2G, H). Content of mature eggs uncleaved. Anus subterminal (Fig. 2C).

COMMENTS. A rare parasite of small passerines. The only record from the Czech Republic were from *Prunella modularis* and *Alauda arvensis* (Baruš 1970a). Few references exist on this species (Wakelin 1967, Wakelin et al. 1970, Baruš 1970a, Baruš & Daniel 1972, Okulewicz 1987).

Aonchotheca sp.

(Fig. 3)

HOST. *Fringilla coelebs*.

PREVALENCE AND INTENSITY. 17 examined / 1 infected, 2 specimens.

SITE. Small intestine.

LOCALITY. Humpolec (July 1978).

DESCRIPTION. Body white, medium-sized. Two lateral bacillary bands present. Stichosome formed by single row of stichocytes provided with large nuclei; stichocytes subdivided into 8–10 annuli (Figs 3A, B). Two medium-sized oval glandular cells present at oesophago-intestinal junction (Fig. 3C).

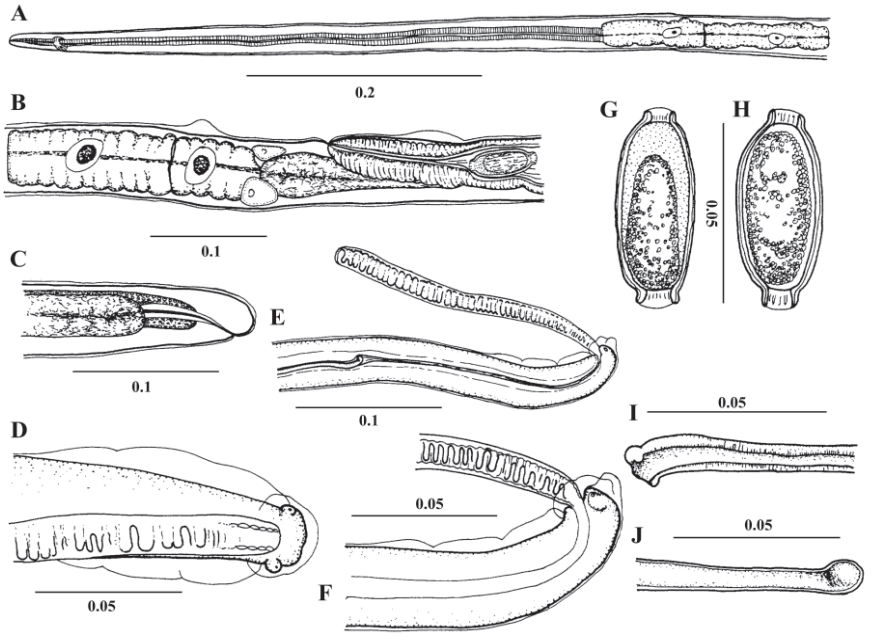

Fig. 2. *Aonchotheca longilfilla* (Dujardin) from *Prunella modularis* (Cat. No. N-774). A – anterior end; B – vulva region; C – caudal end of female; D, E, F – caudal end of male, ventral and lateral views; G, H – eggs; I – proximal end of spicule; J – distal end of spicule. Scale bars in mm.

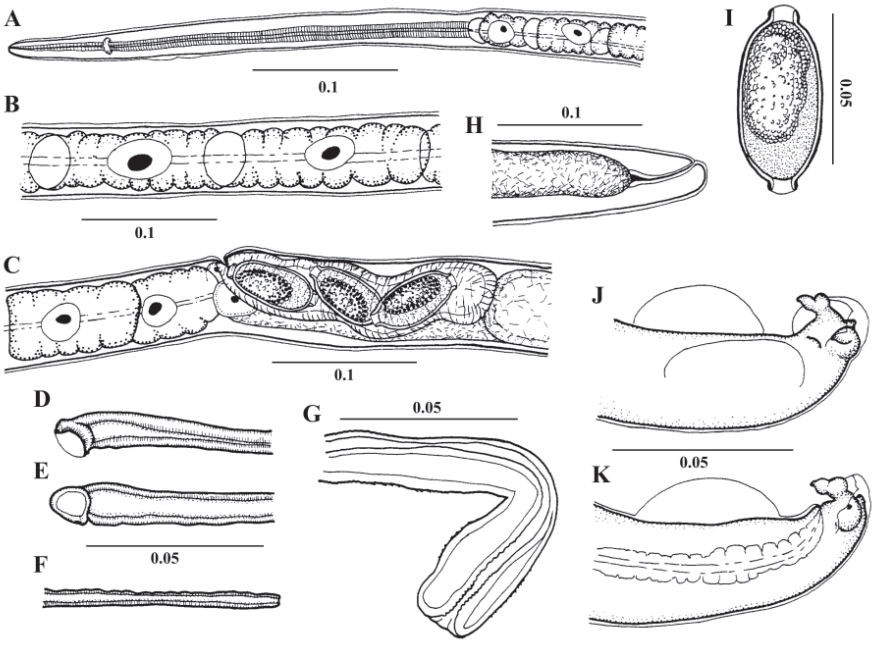

Fig. 3. *Aonchotheca* sp. from *Fringilla coelebs* (Cat. No. N-771). A – anterior end; B – stichocytes; C – vulva region; D, F – proximal end of spicule, lateral and ventral views; F – distal end of spicule; G – spicular sheath; H – caudal end of female; I – egg; J, K – caudal end of male, ventrolateral and lateral views. Scale bars in mm.

Male (1 damaged specimen; anterior half of body missing). Width of lateral bacillary bands 0.018 (width of body 0.045). Spicule well sclerotized, 0.970 long, triangular in section; its proximal end rounded, 0.013 wide (Figs 3D, E), distal end blunt (width 0.005) (Fig. 3F). Spicular sheath without spines (Fig. 3G). Caudal lateral alae present (Figs 3J, K). Membranous bursa reduced, closely surrounding caudal end of body, supported by one dorsomedian and two ventrolateral processes; each of the latter bearing papila (Figs 3J, K). Cloacal opening subterminal.

Female (1 gravid specimen): Body 9.34 long, width at vulva region 0.060. Nerve ring 0.066 from anterior (Fig. 3A). Length of muscular oesophagus 0.310, of stichosome 4.97. Stichosome formed by 51 stichocytes. Vulva at level of oesophago-intestinal junction (5.29 from anterior), slightly protruding (Fig. 3C). Vulvar appendage absent. Eggs oval, thick-walled, with smooth surface (Fig. 3I); length 0.060–0.063, width 0.028–0.030. Content of mature eggs uncleaved. Anus subterminal (Fig. 3H).

Comments. The capillariid nematodes parasitizing small Passeriformes are poorly known. Okulewicz (1993) reported *Baruscapillaria angusta* (Dujardin, 1845) Okulewicz, 1993 from the small intestine of *Fringilla coelebs*. The specimens we found in the intestine of *F. coelebs* were determined as *Aonchotheca* sensu Moravec, 1982 on the basis of the presence of caudal lateral alae and a non-spinous spicular sheath. Closer determination using the key of Baruš & Sergeeva (1990b) was not possible, as nematodes of the genus *Aonchotheca* from birds are poorly known and in need of further revision.

Baruscapillaria carbonis (Dubinin et Dubinina, 1940) Moravec, Scholz et Našincová, 1994

Host. *Phalacrocorax carbo*.
Prevalence and intensity. 2 examined / 1 infected, 17 specimens.
Site. Small intestine.
Locality. Pond Výtopa near Chlum u Třeboně (April 1999).
Comments. A parasite of waterfowl. The taxonomic status of this species was unclear until recently (Moravec et al. 1994, Frantová 2001). This is the first record in the Czech Republic.

Baruscapillaria falconis (Goeze, 1782) Baruš et Sergeeva, 1990

Hosts. *Accipiter gentilis*, *Buteo buteo*.
Prevalence and intensity. *A. gentilis*: 14 examined / 1 infected, 1 specimen; *B. buteo*: 69/8, 1–2 specimens.
Site. Small intestine.
Localities. Čejkovice (December 1981), České Budějovice (February 1980, December 1981), Hluboká n./Vlt. (January 1982), Kamenný Újezd (December 1981), Mydlovary (December 1981), Nová Ves near České Budějovice (January 1982), Týn n./Vlt. (November 1981), Zliv (December 1981), Žabovřesky near České Budějovice (December 1981).
Comments. A common parasite of Falconiformes, reported from the Czech Republic several times (Ryšavý 1957, Tenora & Lusk 1960, Baruš 1964, 1966). The morphology of the specimens was consistent with the description of Baruš (1964).

Baruscapillaria ovopunctata (Linstow, 1873) Moravec, 1982

Host. *Turdus merula*.
Prevalence and intensity. 42 examined / 8 infected, 1–78 specimens.
Site. Small intestine.
Localities. Humpolec (July 1978, January 1982), Litomyšl (July 1978), Praha (September 1978).
Comments. A frequent parasite of Turdidae and Sturnidae (Passeriformes) (Wakelin 1966, Okulewicz 1979b, Machalska & Okulewicz 1984), also recorded in birds (Muscicapidae, Prunellidae) of Cuba and Nepal (Baruš & Garrido 1968, Baruš & Daniel 1976). One bird harboured one male and three gravid females of *B. ovopunctata* together with one male and two gravid females of *Aonchotheca exilis*. The morphology of the specimens was consistent with the descriptions by Wakelin (1966) and Baruš & Sergeeva (1990c). The vulvar appendage was present in 15 of 16 gravid and 1 of 4 nongravid females.

Baruscapillaria resecta (Dujardin, 1845) Okulewicz, 1993

Hosts. *Corvus frugilegus*, *C. monedula*, *Turdus merula*.
Prevalence and intensity. *C. frugilegus*: 15 examined / 5 infected, 2–61 specimens; *C. monedula*: 3/2, 2–15 specimens; *T. merula*: 42/1, 1 specimen.
Site. Small intestine.
Localities. České Budějovice (January to March 1982), Praha (August 1978).
Comments. A common parasite of Corvidae. One male specimens found in *Turdus merula* was small (the length of body 6.94, the length of spicule 0.523) as compared to those from Corvidae (the length of body 7.9–13.95, the length of spicule 0.928–1.373). The morphology of the specimens was consistent with the description by Baruš & Sergeeva (1990a).

***Capillaria* cf. *tenuissima* (Rudolphi, 1809) Yamaguti, 1941**
(Fig. 4)

Host. *Accipiter nisus*.
Prevalence and intensity. 11 examined / 1 infected, 8 specimens.
Site. Small intestine.
Locality. České Budějovice (February 1980).
Description (7 gravid female specimens). Body 13.3–15.6 long, 0.475–0.693 wide. Three distinct bacillary bands present: two lateral (width 0.025–0.033) and one ventral (0.015–0.018 wide). Nerve ring situated 0.819–0.945 from anterior end of body (Fig. 4A). The length of entire oesophagus 4.83–6.32, of stichosome 4.50–5.80. Stichosome formed by single row of 44–54 stichocytes (Fig. 4B). Vulva situated 4.86–6.30 from head end, slightly posterior to oesophagointestinal junction (Fig. 4C). Vulvar appendage absent. Eggs 0.058–0.068 long and 0.025–0.030 wide, with indistinct net-like structure on surface (Figs 4E, F). Content of mature eggs uncleaved. Anus subterminal (Figs 4D).
Comments. *C. tenuissima* is an infrequent parasite of birds of prey (Falconiformes, Strigiformes). Records from the Czech Republic are from Strigiformes (Baruš 1964,1966). In this study, only female specimens were recovered and their morphology was consistent with the description by Baruš & Sergeeva (1989a).

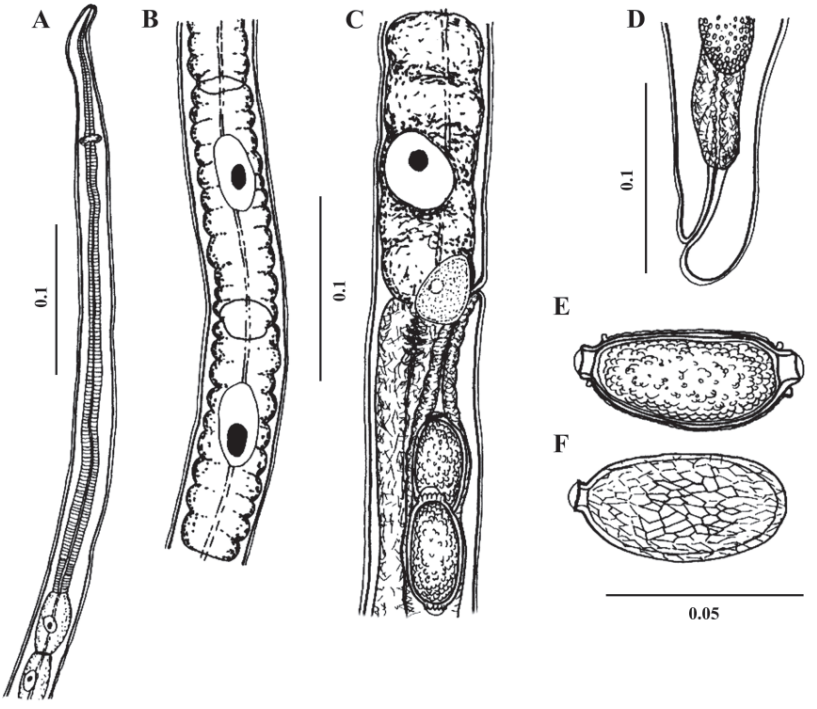

Fig. 4. *Capillaria* cf. *tenuissima* (Rudolphi) from *Accipiter nisus* (Cat. No. N-323). A – anterior end; B – stichocytes; C – vulva region; D – caudal end of female; E, F – eggs. Scale bars in mm.

Capillariidae gen. sp.
(Fig. 5)

Host. *Fringilla coelebs*.
Prevalence and intensity. 17 examined / 1 infected, 1 specimen.
Site. Small intestine.
Locality. Humpolec (August 1978).
Description (based on one damaged nongravid female; head end missing). Maximum width of body 0.078. Three distinct bacillary bands visible on body surface (Fig. 5B): two lateral (width 0.018) and one ventral (0.008). Stichosome formed by single row of stichocytes provided with large nuclei (Fig. 5A). Two medium-sized, oval glandular cells present at oesophago-intestinal junction (Fig. 5A). Vulva somewhat posterior to oesophago-intestinal junction (Fig. 5A). Vulvar appendage absent. Small cuticular process below vulva (length 0.030, width 0.010) (Fig. 5A). No eggs present. Tail end of body rounded, anus subterminal (Fig. 5C).
Comments. The only species of capillariid reported from the small intestine of *Fringilla coelebs* is *Baruscapillaria angusta* (Okulewicz, 1991). In the absence of a male it is not possible to make definit determination in this genus. The only feature this female specimen has that distinguishes it from *B. angusta* is a cuticular process below the vulva. Baruš & Sergeeva (1989a) and Okulewicz (1993) mention a similar structure in female specimens of *Capillaria similis* (Kowalewski, 1904), a relatively frequent intestinal parasite of some Corvidae and Turdidae (birds with feeding habits similar to those of *F. coelebs*).

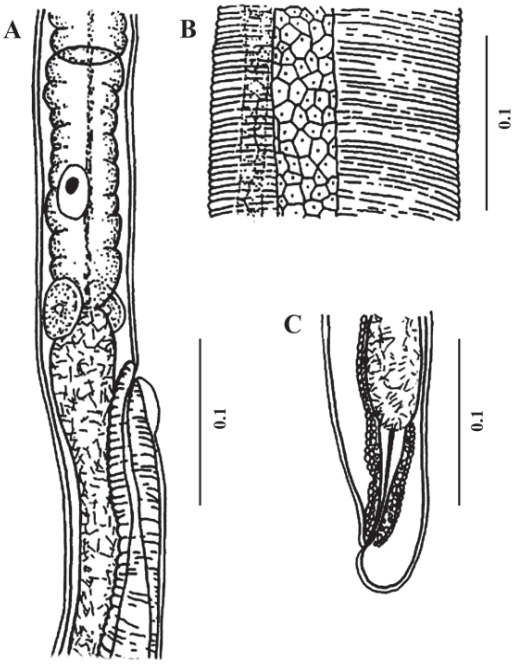

Fig. 5. Capillariidae gen. sp. from *Fringilla coelebs* (Cat. No. N-772). A – vulva region; B – detail of bacillary bands (a – ventral band; b – lateral band); C – caudal end of female. Scale bars in mm.

Eucoleus contortus (Creplin, 1839) López-Neyra, 1947

Hosts. *Corvus corone*, *Larus ridibundus*.
Prevalence and intensity. *C. corone*: 1 examined / 1 infected, 5 specimens; *L. ridibundus*: exact no. of hosts examined unknown / 81 infected, 1–14 specimens.
Site. Oesophagus.
Localities. České Budějovice (1999 throughout the year), Klec (1980, 1982, 1983 throughout the year).
Comments. A common parasite of a wide spectrum of waterfowl as well as terrestrial birds. Morphology of specimens was consistent with the description given by Baruš & Sergeeva (1989b).

Eucoleus cf. *dispar* (Dujardin, 1845) López-Neyra, 1947

Host. *Accipiter gentilis*.
Prevalence and intensity. 14 examined / 1 infected, 2 specimens.
Site. Oesophagus.
Locality. České Budějovice (February 1981).
Comments. A parasite of birds of prey, three times recorded from *Buteo buteo* in the Czech Republic (Škarda 1964, Baruš 1964, 1966). Only female specimens were found in this study and their morphology was consistent with the description by Baruš & Sergeeva (1989b).

Family Anisakidae Railliet et Henry, 1912

Contracaecum rudolphii Hartwich, 1964

Host. *Phalacrocorax carbo*.
Prevalence and intensity. 2 examined / 2 infected, 47–94 specimens.
Site.Gizzard.
Locality. Pond Výtopa near Chlum u Třeboně (April 1999).
Comments. A common parasite of waterfowl. There is one record from *P. carbo* in the Czech Republic (Moravec et al. 1988).

Family Ascarididae Baird, 1853

Porrocaecum depressum (Zeder, 1800) Baylis, 1920

Hosts. *Accipiter gentilis*, *A. nisus*, *Buteo buteo*.
Prevalence and intensity. *A. gentilis*: 14 examined / 5 infected, 1–2 specimens; *A. nisus*: 11/1, 1 specimens; *B. buteo*: 69/11, 1–5 specimens.
Site. Gizzard, small intestine.
Localities. Čejkovice (January 1982), České Budějovice (February 1980), Dasný (December 1981), Dívčice (January 1982), Mydlovary (December 1981), Pištín (January 1982), Protivín (December 1981), Sedlec (December 1981), Týn n./ Vlt. (November 1981), Zliv (December 1981).
Comments. A frequent parasite of birds of prey. One fourth-stage larva was found in the stomach of *A. nisus*, the adults in the intestines of the other hosts. The morphology of the specimens was consistent with the description of Mozgovoi (1953).

Porrocaecum ensicaudatum (Zeder, 1800) Baylis, 1920

Hosts. *Larus ridibundus*, *Turdus merula*, *T. philomelos*.
Prevalence and intensity. *L. ridibundus*: 8 examined / 1 infected, 1 specimen; *T. merula*: 42/2, 2–6 specimens; *T. philomelos*: 13/3, 1–2 specimens.
Site. Gizzard, small intestine.
Localities. České Budějovice (March, April 1999), Praha (June, August, September 1978).
Comments. A typical parasite of Passeriformes (Turdidae, Sturnidae), incapable of maturing in other birds (Anderson 2000). The third-stage larvae were found under the submucosa of gizzard of *Larus ridibundus* (atypical host) and *Turdus philomelos*. Some fourth-stage larvae were located at the same site in *T. merula* and *T. philomelos* or, together with subadult specimens, embedded in the mucosa of the small intestine.

Porrocaecum semiteres (Zeder, 1800) Baylis, 1920

Hosts. *Larus ridibundus*, *Turdus philomelos*.
Prevalence and intensity. *L. ridibundus*: exact no. examined unknown / 2 infected, 1–4 specimens; *T. philomelos*: 13/5, 1–49 specimens.
Site. Gizzard.
Localities. České Budějovice (March, April 1999), Klec (March, April 1982, 1983), Praha (June 1978).
Comments. A typical parasite of Charadriiformes, incapable of maturing in Passeriformes (Jygis 1967). Only the third- and fourth-stage larvae were found.

Family Syngamidae Leiper, 1912

Cyathostoma lari Blanchard, 1849

Host. *Larus ridibundus*.
Prevalence and intensity. exact no. examined unknown / 39 infected, 1–11 specimens.
Site. Nasal and orbital cavities.
Localities. České Budějovice (March, April, September 1999), Klec (March to November 1982, 1983).
Comments. A relatively common parasite reported from many species of birds belonging to Charadriiformes, Ciconiiformes and Passeriformes (four cases of infection in Falconiformes recorded by Simpson & Harris 1992). Its occurrence in the Czech Republic was recorded by Zavadil (1961), Baruš et al. (1978) and Bušta et al. (1985). The morphology of the specimens was consistent with the description given by Burt & Eadie (1958).

Syngamus merulae Baylis, 1926

Host. *Turdus merula*.
Prevalence and intensity. 42 examined / 2 infected, 1 pair.
Site. Trachea.
Localities. Humpolec (July 1978).
Comments. A common parasite mainly specific to Turdidae (Passeriformes). Its occurrence in the Czech Republic was recorded by Zavadil (1955), Ryšavý (1957), Baruš & Groschaft (1965), Koubek & Vojtek (1973).

Family Acuariidae Railliet, Henry et Sisoff, 1912

Acuaria anthuris (Rudolphi, 1819) Railliet, Henry et Sisoff, 1912

Host. *Corvus frugilegus*.
Prevalence and intensity. 15 examined / 5 infected, 1–6 specimens.
Site. Gizzard.
Locality. České Budějovice (January to March 1981, 1982).
Comments. A common parasite of Corvidae. Baruš et al. (1972) confirmed that this species is found all year round in Czech Republic.

Cosmocephalus obvelatus (Creplin, 1825) Seurat, 1919
(Tab. 5)

Host. *Larus ridibundus*.
Prevalence and intensity. Exact no. examined unknown / 5 infected, 1–2 specimens.
Site. Oesophagus.
Locality. Klec (April to August 1982, 1983).
Comments. A parasite of piscivorous birds, not frequent in the Czech Republic (Baruš et al. 1978, Bušta et al. 1985); probably introduced by birds migrating from areas where the intermediate hosts (Amphipoda) occur (for the life cycle see Wong & Anderson 1981). The morphology of specimens was consistent with the redescription of this species by Anderson & Wong (1981), but their measurements were smaller (Tab. 5).

Family Aproctidae Yorke et Maplestone, 1926

Aprocta cylindrica Linstow, 1883

Host. *Erithacus rubecula*.
Prevalence and intensity. 19 examined / 2 infected, 5–35 specimens.

Tab. 5. Measurements (mm) of *Cosmocephalus obvelatus* (Creplin, 1825) from *Larus ridibundus* (the present study) and *L. delawarensis* Ord (published data after Anderson & Wong 1981)

author	males published data	present study	females published data	present study
number of specimens	10	3	10	2 nongravid
length of body	9.9–14.3	7.71–9.33	15.8–22.3	12.67–12.86
width of body	0.200–0.350	0.192–0.288	0.320–0.500	0.352–0.384
length of buccal cavity	0.380–0.510	0.365–0.378	0.570–0.730	0.403
nerve ring – anterior	0.420–0.530	0.391–0.397	0.640–0.770	0.309–0.435
deirids – anterior	0.350–0.540	0.252–0.391	0.610–0.790	0.315–0.488
excretory porus – anterior	0.500–0.680	0.334–0.473	0.705–0.940	0.384–0.512
length of muscular oesophagus	1.0–1.3	0.736–0.752	1.2–1.5	0.992–1.088
length of glandular oesophagus	3.6–4.3	3.20–3.81	4.1–5.1	3.65–4.48
length of wright spicule	0.180–0.220	0.113		
length of left spicule	0.590–0.700	0.496		
length of tail	0.400–0.500	0.284	0.220–0.380	0.240
vulva – anterior			7.4–10.4	5.86–6.18
egg: length			0.040–0.045	–
egg: width			0.025	–

SITE. Nasal and orbital cavities.
LOCALITY. Purkarec (March, April 1982).
COMMENTS. An oviparous filarioid species parasitizing a wide range of Passeriformes (Sonin 1966). Records from the Czech Republic are from *Erithacus rubecula* (Sonin & Baruš 1971). Sitko (personal communication) frequently found it in this host when it arrived spring. It is likely the bird becomes infected in the wintering areas and not in Czech Republic. The transmission and the development of *A. cylindrica* is poorly understood (Quentin et al. 1976).

A c k n o w l e d g e m e n t s

The author thanks to F. Moravec from the Institute of Parasitology, ASCR, in České Budějovice for his critical comments and for providing some materials from the helminthological collection, and J. Sitko from the Museum of Komenský, Přerov, for consultations. The study was partly supported by the grant No. K2-022-601 from the ASCR.

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