

New records of *Ascaridia platyceri* (Nematoda) in parrots (Psittaciformes)

V. KAJEROVA¹, V. BARUS², I. LITERAK¹

¹Department of Biology and Wildlife Diseases, University of Veterinary and Pharmaceutical Sciences Brno, Czech Republic

²Institute of Vertebrate Biology, Academy of Sciences of the Czech Republic, Brno, Czech Republic

ABSTRACT: The aim of the study was to determine the range of species of ascarids in parrots in the Czech Republic. Ascarids were found during post-mortem parasitological examination of 38 psittaciform birds belonging to 15 different species. All ascarids found were determined as *Ascaridia platyceri*. Nine bird species were determined as new hosts of this parasite. *A. platyceri* is a typical ascarid for parrots of Australian origin. The fact that this parasite was found in bird species of African origin demonstrated a possibility of spread of *A. platyceri* to hosts of different zoogeographical origin. *A. platyceri* was described in detail from the host *Melopsittacus undulatus* and differentiated from other ascarids on the basis of morphological and quantitative traits. The most important differentiating traits included the presence of interlabia in both sexes. In males, the traits important for species identification included the number and location of caudal papillae (a total of 9 to 10 pairs), relatively short spicula and absence of cuticular alae on the spicula, while females featured a conical shape of the tail.

Keywords: ascarids; morphology; nematodes; Czech Republic; birds

Ascarids can cause serious and frequently fatal diseases in parrots (Schock and Cooper, 1978; Melendez and Lindquist, 1979; Greiner and Ritchie, 1994). Ascarids in parrots are a common problem in veterinary profession, but only seldom they are determined to the species (Kronberger and Schuppel, 1976; Landelius et al., 1978; Reddacliff, 1982; Albicker-Rippinger and Hoop, 1999; Martinez et al., 1999; Patel et al., 2000).

Seven nematode species in total have been so far registered in birds of the order Psittaciformes. Two nematode species have been detected most frequently – *Ascaridia hermaphrodita* (Froelich, 1789) (Travassos, 1913, 1930; Skrjabin, 1917; Vevers, 1923; Canavan, 1931; Pereira, 1933; Mozgovoj, 1953; Baruš, 1969; Schmidt and Neiland, 1973; Serra Freire and Bianchin, 1978), and *A. platyceri* (= *A. sprengi*) Hartwich and Tscherner, 1979 (Hartwich and Tscherner, 1979;

Mines, 1979; Webster, 1982). Furthermore are in parrots described *A. sergiomeirai* Pereira, 1933 (Pereira, 1933; Pinto et al., 1993), *A. ornata* Kreis, 1955 (Kreis, 1955) and *A. nicobarensis* Soota, Srivastava et Ghosh, 1971 (Soota et al., 1971). *A. columbae* (Gmelin, 1780) (Johnston and Mawson, 1941; Ferrola et al., 1976; Mines and Green, 1983) as well as *A. galli* (Schrank, 1788) (Peirce and Bevan, 1973; Patel et al., 2000) are facultative parasites of parrots.

In Europe, *A. platyceri* and *A. hermaphrodita* were recorded in Germany (Hartwich and Tscherner, 1979), while *A. galli* was found in Great Britain (Peirce and Bevan, 1973) in parrots in captivity.

The present study gives data on the first detection of *A. platyceri* in the Czech Republic. New hosts among parrots in captivity are reported at the same time and the data on parasite morphology are also presented.

MATERIAL AND METHODS

The infection with nematodes showing morphological traits of ascarids was observed in the small intestine during post-mortem examinations of parrots. We investigated the following parrots species: *Melopsittacus undulatus* (Shaw, 1805) – 70 birds, *Platycercus eximius* (Shaw, 1792) – 10, *Cacatua sulphurea* (Gmelin, 1788) – 2, *Alisterus scapularis* (Lichtenstein, 1818) – 3, *Psittacula krameri* (Scopoli, 1769) – 3, *Agapornis fischeri* Reichenow, 1887 – 4, *Psephotus haematonotus* (Gould, 1838) – 3, *Barnardius zonarius* (Shaw, 1805) – 2, *Neophema splendida* (Gould, 1841) – 1, *Agapornis roseicollis* (Vieillot, 1818) – 4, *Agapornis personatus* (Reichenow, 1887) – 2, *Platycercus elegans* (Gmelin, 1788) – 6, *Cacatua ducorpsii* (Pucheran, 1853) – 1, *Aratinga jandaya* (Gmelin, 1788) – 2, *Amazona leucocephala* (Linnaeus, 1758) – 1. The parrots came from ZOOs, private owners, shops with animals, veterinary clinics and private veterinarians.

Nematodes were fixed in 10% formaldehyde, 70% and 96% ethanol, and prepared for the examination as a temporary microscopic specimen in glycerine according to Moravec (1994). Morphological and quantitative traits (given in mm) were recorded using a light microscope at the magnifications of 40×, 100× and 400×.

The measurements were taken from 14 male and 14 female specimens found in *Melopsittacus undulatus*. Reference material is deposited at the collection of the Institute of Parasitology, Academy of Sciences of the Czech Republic, Ceske Budejovice, Czech Republic.

RESULTS

Determination of nematodes and hosts of *Ascaridia platyceri*

All ascarids that we found in parrots from the Czech Republic were determined as *Ascaridia platyceri* Hartwich et Tscherner, 1979 (= syn. *A. sprengi*, Mines, 1979). *A. platyceri* was found in *Melopsittacus undulatus* – 14 birds, *Platycercus eximius* – 7, *Cacatua sulphurea* – 2, *Alisterus scapularis* – 2, *Psittacula krameri* – 2, *Agapornis fischeri* – 2, *Psephotus haematonotus* – 1, *Barnardius zonarius* – 1, *Neophema splendida* – 1, *Agapornis roseicollis* – 1, *A. personatus* – 1, *Platycercus elegans* – 1, *Cacatua ducorpsii* – 1, *Aratinga jandaya* – 1 and *Amazona leucocephala* – 1.

Description and morphometry of *A. platyceri* from parrots from the Czech Republic

The nematodes are typical with a heavy body, strong transversally grooved cuticle and white colour. A shallow incisure clearly separates the head from the remaining part of the body. The opening of the oral cavity is delineated by three lips, which width extends their length. Conical interlabia protrude between the lips. The interlabia have blunt tips and do not exceed one half of the length of the lips (Figure 1A). Other morphological features include two large subdorsal double papillae on dorsal lip, subventral lips with one large double subventral papilla on each lip and one amphid. Lateral cuticular alae are present, widest in the oesophageal region near the excretory pore, and becoming narrower behind the oesophago-intestinal junction. Excretory pore and cervical papillae are situated closely behind the nerve ganglion. The oesophagus is straight, without diverticulum, ventriculus, bulb or valvular apparatus.

Males have the tail with ventrolateral caudal alae, each supported by nine (in one male from *Cacatua sulphurea* by ten) pedunculated papillae arranged in two longitudinal rows on each side. Three pairs of papillae are situated precloacally extending from precloacal sucker to the cloaca, two pairs are situated paracloacally, and four pairs postcloacally (Figure 1B). The openings of phasmids are situated on the base of the last pair of postcloacal papillae. Precloacal sucker has a thick sclerotized rim. Two spiculae are well sclerotized, with identical morphology and identical or almost identical length, and with no cuticular alae. The tail tip has a short conical protrusion.

Females have conical tail with a small mucron at its tip (Figure 1C) and phasmids on each side near the tip. The vulva is situated in the middle part of the body in the form of a narrow transversal opening, usually with slightly salient margins. The vagina is thick-walled, joining thin-walled undivided part of the uterus, and then dividing into two branches extending to opposite directions. The eggs are oval, with thick smooth shell, containing homogeneous yolky material.

Morphometry of *A. platyceri* was made from the host *Melopsittacus undulatus*. In total 16 traits in males and 15 traits in females were measured. Results of the measurements are presented in Table 1. No significant differences were found when comparing

Table 1. Measurements (in mm) of *A. platyceri* from *Melopsittacus undulatus* and comparative data according to Hartwich and Tscherner (1979) from *Platycercus eximius* and Mines (1979) from *Psephotus haematogaster*

Characters	Males				Females			
	Our measurement		Hartwich and Tscherner (1979)	Mines (1979)	Our measurement		Hartwich and Tscherner (1979)	Mines (1979)
	range (N*)	mean \pm SD			range (N*)	mean \pm SD		
Number of specimens	8–14		not determined	7	8–14		not determined	7
Length	14.00–26.00 (11)	20.16 \pm 3.55	10–46	27–32	24.50–36.50 (14)	29.46 \pm 2.97	25–62	30–40
Max. width	0.68–1.20 (11)	0.951 \pm 0.132	0.29–1.15	0.51–0.63	0.85–1.25 (10)	1.103 \pm 0.133	0.26–1.38	0.569–0.950
Dorsal lip (length)	0.075–0.125 (14)	0.100 \pm 0.014	not measured	0.121–0.143	0.088–0.150 (8)	0.113 \pm 0.020	not measured	0.121–0.187
Dorsal lip (width)	0.125–0.220 (14)	0.188 \pm 0.024	not measured	0.165–0.198	0.188–0.245 (8)	0.224 \pm 0.019	not measured	0.198–0.264
Interlabium (length)	0.020–0.043 (14)	0.027 \pm 0.006	2/5 of lips length	0.039	0.023–0.043 (10)	0.034 \pm 0.006	2/5 of lips length	0.039–0.052
Subventral lips (length)	0.075–0.138 (14)	0.105 \pm 0.016	not measured	0.121–0.154	0.093–0.153 (9)	0.126 \pm 0.018	not measured	0.110–0.176
Subventral lips (width)	0.200–0.305 (14)	0.252 \pm 0.027	not measured	0.165–0.209	0.250–0.310 (9)	0.281 \pm 0.022	not measured	0.198–0.264
Lateral ala (max. width)	0.045–0.075 (2)	0.060 \pm 0.015	0.06–0.10	0.066–0.088	0.057–0.057 (1)	0.057 \pm 0.000	0.06–0.10	0.066–0.077
Oesophagus (length)	1.200–1.625 (13)	1.488 \pm 0.115	0.85–2.54	1.741–2.200	1.325–1.875 (14)	1.577 \pm 0.177	1.53–2.56	1.80–2.31
Oesophagus (max. width)	0.220–0.380 (12)	0.299 \pm 0.049	not measured	0.231–0.330	0.270–0.480 (12)	0.347 \pm 0.054	not measured	0.286–0.363
Precloacal sucker (outside diameter)	0.180–0.280 (12)	0.238 \pm 0.032	0.12–0.30	0.253–0.275				
Precloacal sucker (inside diameter)	0.140–0.200 (12)	0.179 \pm 0.024	not measured	0.176–0.209				
Cloaca (to tip of tail)	0.490–0.670 (11)	0.606 \pm 0.064	0.28–0.78	0.507–0.665				
Number of caudal papillae	9 pairs (8)	9 \pm 0	9–10 pairs	9–10 pairs				
Spicules (length)	0.675–1.375 (9)	1.032 \pm 0.150	0.710–1.350	0.950–1.170				
Tip of tail (length)	0.010–0.020 (10)	0.013 \pm 0.003	0.020	not measured	0.010–0.030 (13)	0.018 \pm 0.005	0.025	not measured
Vulva (distance from anterior end)					8.80–14.00 (9)	12.022 \pm 1.532	12.3–29.6	15.4–20.0
Anus (to tip of tail)					0.550–0.730 (14)	0.643 \pm 0.062	0.55–0.97	0.317–0.792
Ova (length)					0.060–0.080 (14)	0.073 \pm 0.006	0.067–0.090	0.065–0.078
Ova (width)					0.040–0.050 (14)	0.049 \pm 0.003	0.045–0.057	0.047–0.050
Host	<i>Melopsittacus undulatus</i>		<i>Platycercus eximius</i>	<i>Psephotus haematogaster</i>	<i>Melopsittacus undulatus</i>		<i>Platycercus eximius</i>	<i>Psephotus haematogaster</i>

N* = the number of specimens with measured traits

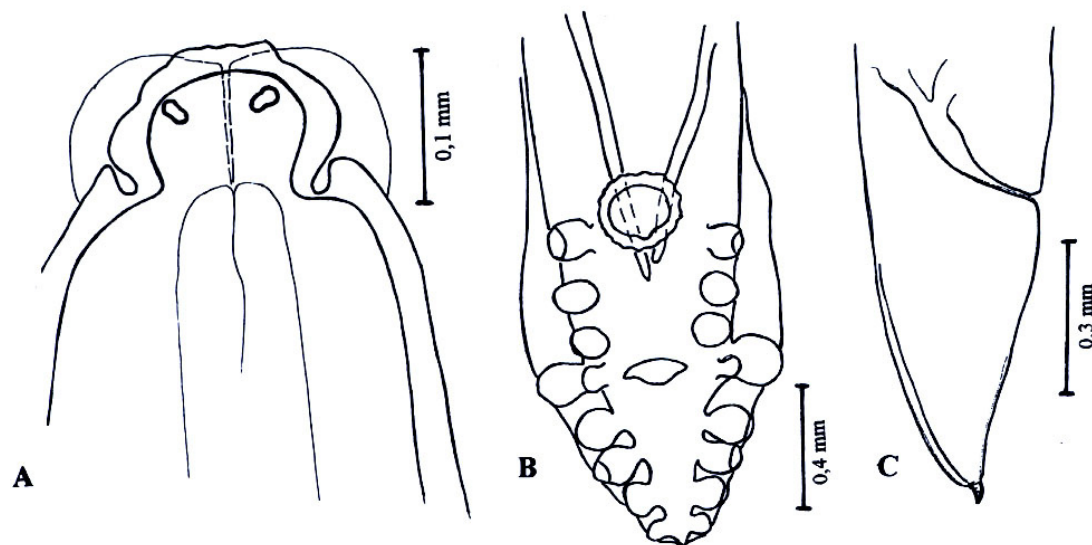


Figure 1. *Ascaridia platyceri*. A = anterior end (dorsal view), B = male – posterior end (ventral view), C = female – posterior end (lateral view); original drawing

the results with morphometric values of *A. platyceri* published by Hartwich and Tscherner (1979), and of *A. sprengi* by Mines (1979).

DISCUSSION

The nematode specimens of the genus *Ascaridia* (Dujardin, 1845) from parrots in our collection were identified as *A. platyceri* according to their morphology and corresponding measurable traits. The presence of interlabia is typical for this species, while in other species of the genus *Ascaridia* this morphological feature is exceptional. Thus *A. platyceri* can be differentiated from all other ascarids parasitizing parrots. The differentiation of *A. platyceri* from *A. nicobarensis* may become slightly problematic, since the original description of the latter by Soota et al. (1971) was very brief and incomplete. The information on the presence or absence of interlabia as well as of cuticular alae on spiculae was missing. However, *A. nicobarensis* can be differentiated according to the length of the spicula and the size of eggs.

The fact that *A. platyceri* exists in the form of long-term surviving populations parasitizing both Australian and African parrots kept in captivity in Europe is an important epidemiological finding. It is also important to note that parrots kept together with other birds may be infected with ascarids not specialised for Psittaciformes (*A. galli* and *A. columbae*) and vice versa (a detection of *A. sergiomeirai* in

Pipile jacutinga (Spix, 1825) of the order Galliformes, Serra Freire and Bianchin, 1978). Due to the serious nature of the disease this knowledge is very important.

The occurrence of ascarids in parrots in the Czech Republic is not rare. In the past, however, the species of these parasites was usually not determined. In our study ascarids were found in 38 birds of 15 parrot species. All parasites belonged to the species *A. platyceri*, which was confirmed in the following 9 new host species: *Agapornis fischeri*, *Agapornis roseicollis*, *Alisterus scapularis*, *Amazona leucocephala*, *Aratinga jandaya*, *Barnardius zonarius*, *Cacatua ducorpsii*, *Cacatua sulphurea*, *Psittacula krameri*. *A. platyceri* in *Platycercus eximius*, *Platycercus elegans* and *Psephotus haematonotus* was described by Hartwich and Tscherner (1979) in Germany, in *Neophema splendida* by Mines (1979), in *Agapornis personatus* by Weeks (1981) and *Melopsittacus undulatus* by Webster (1982) in Canada.

REFERENCES

- Albicker-Rippinger P., Hoop R.K. (1999): Common diseases in psittacines and passerines – postmortem findings. Tierarztl. Prax., 27, 245–254.
- Barus V. (1969): Nematodes parasitic in birds of Cuba. Vestník Cs. Spol. Zool., 33, 193–210.
- Canavan W.P.N. (1931): Nematode parasites of vertebrates in the Philadelphia Zoological Garden and vicinity. II. Parasitol., 23, 196–229.

- Ferrola M.I., Resende M., Ferreira Filho J. (1976): Hiperinfestacao de *Melopsittacus undulatus* por *Ascaridia columbae*, Gmelin 1790. Cienc. Cult., 28, 438.
- Greiner, E.C., Ritchie, B.W. (1994): Parasites. In: Ritchie B.W., Harrison G.J., Harrison L.R. (eds.): Avian Medicine. Wingers Puglising, Inc., Lake Worth, Florida, USA. 1007–1029.
- Hartwich G., Tscherner W. (1979): *Ascaridia platyceri* n. sp. Eine neue Spulwurmart aus Papageien. Angew. Parasitol., 20, 63–67.
- Johnston T.H., Mawson P.M. (1941): Some parasitic nematodes in the collection of the Australian Museum. Rec. Aust. Mus., 21, 9–16.
- Kreis H.A. (1955): Beitrage zur Kenntnisparasitischer Nematoden. XVII. Ein neuer Nematode aus dem Amazonenpapagei: *Ascaridia ornata*. Zentralbl. Bakteriolog. Parasitenkd. Infektionskr. Hyg. Abteilung 1. Origin. Abt. 2., 163, 556–559.
- Kronberger H., Schuppel K.F. (1976): Causes of death in zoo birds of the Australian region. Erkrankungen der Zootiere, 63–67.
- Landelius L., Heidenreich M., Stiburek R. (1978): Diagnosis, treatment and prevention of roundworm infection in parakeets and parrots. Voliere, 1, 74–77.
- Martinez F.A., Troiano J.C., Binda J.L., Santa Cruz A. (1999): Capillaria and Ascaridia infestations in breed-enig parrots. Rev. Med. Vet., 80, 24–26.
- Melendez D., Lindquist W.D. (1979): Experimental life cycle of *Ascaridia columbae* in intravenously infected pigeons, *Columba livia*. J. Parasitol., 65, 85–88.
- Mines J.J. (1979): *Ascaridia sprengi*, a new species of nematode in Australian parrots. Int. J. Parasitol., 9, 371–379.
- Mines J.J., Green P.E. (1983): Experimental *Ascaridia columbae* infection in budgerigars. Aust. Vet. J., 60, 279–280.
- Moravec F. (1994): Parasitic nematodes of freshwater fishes of Europe. Academia, Prague, 473 pp.
- Mozgovoj A.A. (1953): Osnovy nematologii – Tom. 2. Askaridaty zhivotnykh i cheloveka i vyzyvaemye imi zabolevaniya. Kniga I. Publ. House AN SSSR, Moskva, 352 pp.
- Patel P.V., Patel A.I., Sahu R.K., Raju Vyas (2000): Prevalence of gastrointestinal parasites in captive birds of Gujarat Zoos. Zoos Print Journal, 15, 295–296.
- Peirce M.A., Bevan B.J. (1973): *Ascaridia galli* (Schrunk, 1788) in psittacine birds. Vet. Rec., 92, 261.
- Pereira C. (1933): Novo nematoide parasito de psitacideos. Rev. Med. Chirurg. Brasil, Rio de Janeiro, 41, 7–10.
- Pinto R.M., Vicente J.J., Noronha D. (1993): Nematode parasites of Brazilian psittacid birds, with emphasis on the genus *Pelecitus* Railliet & Henry, 1910. Mem. Inst. Oswaldo Cruz, 88, 279–284.
- Reddacliff G. (1982): Parasite control in Taronga Zoo. New South Wales Vet. Procc., 18, 61–64.
- Serra Freire N.M., Bianchin I. (1978): Sobre quarto especies de *Ascaridia* (Dujardin, 1845) parasitas de psitacideos, com citacao de um novo hospedeiro para *A. hermaphrodita* (Froelich, 1789) (Nematoda: Ascaridoidea) no Brasil. Atas Soc. Biol. Rio de Janeiro, 19, 51–54.
- Schmidt G.D., Neiland K.A. (1973): Helminth fauna of Nicaragua. V. *Cardiofilaria stepheni* sp. n. (Onchocercidae) and other nematodes of birds. Proc. Helm. Soc. Wash., 40, 285–288.
- Schock R.C., Cooper R. (1978): Internal parasitisms in captive birds. Mod. Vet. Pract., 59, 439–443.
- Skrjabin K.I. (1917): Sur quelques nematodes des oiseaux de la Russie. Parasitol., 9, 460–481.
- Soota T.D., Srivastava C.B., Ghosh R.K. (1971): Studies on the helminth fauna of the Great Nicobar Island. Proc. Ind. Acad. Sci., 73, 20–22.
- Travassos L. (1913): Sobre as especies brasileiras da subfamilia Heterakinae Railliet & Henry. Trabalho Inst. Osw. Cruz, Rio de Janeiro-Manguinhos, 1–33.
- Travassos L. (1930): Fauna helminthologica dos “Psittacidae” do Brasil. Arch. Inst. Biologico, 3, 5–20.
- Vevers G.M. (1923): Some new and little known helminths from British Guiana. J. Helminth., 1, 35–45.
- Weeks P.J. (1981): *Ascaridia platyceri* in a Masked Lovebird. N.Z. Vet. J., 29, 241–242.
- Webster W.A. (1982): Internal parasites found in exotic birds imported into Canada. Can. Vet. J., 23, 230.

Received: 03–08–01

Accepted after corrections: 04–05–02

Corresponding Author

MVDr. Vilma Kajerova, Department of Biology and Wildlife Diseases, University of Veterinary and Pharmaceutical Sciences Brno, Palackeho 1–3, 612 42 Brno, Czech Republic
Tel. +420 541 562 638, fax +420 549 243 020, e-mail: kajerovav@vfu.cz, vilma.kajerova@seznam.cz