Research note

Corrections to description of Cardiofilaria dubia (Nematoda) parasitizing Australian parrot

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Summary

The species Cardiofilaria dubia (Johnston et Mawson, 1940) parasitizing Australian parrot (Cacatua sp.) were morphometrically studied and redescribed. The original description was corrected in some morphological details (male head, structure of oesophagus, number of cloacal papillae). Evidence of errors in the original description of cloaca – tail distance (0.7 vs. 0.806 mm) and spicule length (0.01 mm versus 0.069 – 0.075 mm) were documented. Differentiation of C. dubia from other species of the genus Cardiofilaria was discussed.

Key words: Cardiofilaria dubia; morphometry; Cacatua sp.; redescription

Introduction

There are sixteen species arranged in the genus Cardiofilaria Storm, 1937 (family Splendidofilarididae) specialized parasites of avian hosts (Anderson & Bain, 1976; Anderson & Freeman, 1969; Bartlett & Anderson, 1980; Chabaud & Bain, 1990; Sonin, 1968, 1977). Only two species of this genus parasitizing in psittacine birds (Psittaciformes) are known: Pinto et al. (1993) and Baruš & Tůkač (1997) repeatedly reported the presence of C. pyrrhurae (Freitas et Mendonça, 1952) from South American psittacine birds. Johnston & Mawson (1940) described the C. dubia from Australian parrot. Dharna et al. (1985) reported non-exactly determined taxon Cardiofilaria sp. from two non-exactly determined species of cockatoos and two Eos borneae (Linnaeus, 1758) from the Eastern Islands of Indonesia. Sonin (1961, 1968) put this taxon, originally arranged into genus Carinema (Perreira et Vaz, 1933), into the genus Cardiofilaria and alerted to possible errors in the original description (tail length of male, spicule length).

Our specimens of nematodes obtained from Cacatua sp. were evaluated as conspecific with C. dubia and in this note we specified its determinative features.

Material and Methods

During the years 2002 – 2004, 143 psittacine birds of thirty species kept in captivity in the Czech Republic were investigated post-mortem for the infection with nematodes. In one specimen from Cacatua sp., which died soon after import from Australia, four adult nematodes (1 male and 3 females) were found in the abdominal cavity. All nematodes were fixed in 4% formalin and purified in glycerine-water solution. The nematodes were examined by light microscope with differential interference contrast (DIC) and measured by digital image analysis system (ProPlus 1.3 for Windows 95). Drawings were made by the camera lucida and dimensions were given in millimetres.

Results

The morphology of the examined nematodes fully resembles to the genus Cardiofilaria and the morphometry (see Table 1, and discussion) is very similar or identical with taxon Cardiofilaria dubia (Johnston et Mawson, 1940).

Description (Fig.1): There is medium-sized nematode, widest at about middle, with smooth cuticle, lacking bosses or conspicuous striae. The head of male is narrower; head of the female is widely rounded (Fig. 1A, B, D). Mouth is round or dorsoventrally elongated, leading by 0.005 – 0.007 long funnel-shaped vestibule to oesophagus. The base of this vestibule is surrounded by slightly sclerotized ring. The head has four papillae in outer circle; four in inner circle, and all are very small. Amphidial pores are conspicuous (Fig.1A). Oesophagus is very narrow, not divided and muscular throughout (Fig.1B, D) with nerve ring in about anterior one-third. There is an excretory pore at the level of nerve ring; cilia or alae are absent.

Male: Tail is rounded; spicule are slightly unequal in length, distally tapering. Papillae are very small and distributed around the cloacal opening in number eight, two...
pairs are near the top of tail (Fig. 1E). Gubernaculum is absent.

Female: Tail is rounded; anus is atrophied (Fig. 1C) and situated 0.18 – 0.20 from posterior end. Vulva with non-salient lips is founded behind the oesophagus. Microfilariae are present.

Cardiofilaria dubia described originally by Johnston and Mawson (1940) from host Geoffroyus geoffroyi melanosani (MacGillivray, 1913) (locality North Queensland). The head of our male nematode is mildly narrower and slightly obtuse (in original description rounded only). Division of the oesophagus into two parts (division is more clearly indicated in some specimens than others, the distinc-

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Male</th>
<th>Female</th>
</tr>
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<tbody>
<tr>
<td>Authors (number of specimens)</td>
<td>2 (n=1)</td>
<td>1-2 (n=3)</td>
</tr>
<tr>
<td>Body length</td>
<td>15</td>
<td>17.08</td>
</tr>
<tr>
<td>Body width</td>
<td>0.184</td>
<td>0.290</td>
</tr>
<tr>
<td>Oesophagus length</td>
<td>0.38</td>
<td>0.35</td>
</tr>
<tr>
<td>Distance cloaca - tail</td>
<td>0.7</td>
<td>0.086</td>
</tr>
<tr>
<td>Spiculae length</td>
<td>0.010</td>
<td>0.069 - 0.075</td>
</tr>
<tr>
<td>Distance head - vulva</td>
<td>–</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Table 1. Comparative features of Cardiofilaria dubia. Measurements in mm.

1 – according to Johnston & Mawson (1940); 2 – our data.

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Discussion

By the comparison of morphological signs, we found small differences in the shape of the head end in our nematode specimens from Cacatua sp. (imported from Australia) and

Fig. 1. Cardiofilaria dubia from the host Cacatua sp.
A – male head end (detail); B – female anterior extremity (total view); C – female tail (anterior view); D – male anterior extremity (total view); E – male caudal end (lateral view). Original.

The species C. dubia differs from other species of the genus Cardiofilaria in body length of male (> 15.0 mm; the other are smaller < 13.5 mm). Male from this genus has narrow range of the spiculae length 0.060 – 0.122 mm (except C. pyrhrbui, left 0.126 – 0.190 mm, right 0.108 – 0.150 mm) and tail is shorter than spiculae (0.044 – 0.090 mm) (Barui & Tukac, 1997; Freitas & Mendoça, 1952). The body length of female from the genus Cardiofilaria is also characteristic sign, but for differentiation of taxons less significant. Species C. dubia, C. pyrhrbui and C. stephni (Schmidt & Neiland, 1973) from host of order Passeriformes (Formicariidae) from Nicaragua and C. micropenis (Travassos, 1926) from Piciformes (Rhamphastidae) from Brazil have the body longer than 20 mm. The specimen Cardiofilaria sp. from Indonesian parakeets (Dharma et al., 1985) belongs to this sized group of cardiofilarids, because of the body length of male 20 – 25 mm (other data are not showed).
Reppus et al. (1995) during investigation of microfilarae-
nia in Australian native birds found one positive case in
the Western Rosella (Platycercus icterotis) (Kahl, 1820).
But no adult filarioid worm was found in this host. In
drakeets, as in other bird hosts with blood microfilariae
(namely by Cardiofilaria and other genera), have not yet
been correlated the presence with adult nematode parasites
(Berdeyev, 1979; Dharmar et al., 1985; Reppus et al., 1995).
Adult filarioid worms often are not found at routine necro-
copy in birds in which microfilariae have been detected
(Campbell, 1988). Careful dissection may be required to
locate adult filarioid nematodes in birds in generalists
tion with adult filarioid worms and microfilariae may be an
important contributing cause of death in some birds.

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