Instructions for use

STRONGYLOIDES AVIUM CRAM, 1929 (STRONGYLOIDIDAE : NEMATODA) FROM RALLUS AQUATICUS INDICUS BLYTH

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Citation
Japanese Journal of Veterinary Research, 16(1): 44-47

Issue Date
1968-03

DOI
10.14943/jjvr.16.1.44

Doc URL
http://hdl.handle.net/2115/1898

Type
bulletin

File Information
KJ00002369711.pdf

Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP
Three parasitic females of *Strongyloides* were obtained from the caeca of an eastern water-rail *Rallus aquaticus indicus* BLYTH captured at Ishikari near Sapporo. The rail was dissected on October 8, 1964.

*Strongyloides avium* CRAM, 1929

**Host** *Rallus aquaticus indicus* BLYTH

**Habitat** Caecum

**Locality** Ishikari, Hokkaido, Japan

Description of parasitic female: Fine threadlike nematodes. Length of body 1.63–2.14 mm (average 1.90 mm); maximal width 0.038–0.046 mm (0.041 mm); body length/body width 35.4–54.7 (47.0). Tail short and conically tapered. Circumoral elevation divided indistinctly into paired right and left subdorsal, lateral and, subventral labial lobes. Stoma hexagonal and shallow. Esophagus filariform, 0.475–0.675 mm (0.548 mm) in length, 22.3–34.7 % (29.1 %) per body length; body length/length of esophagus 2.9–4.5 (3.6), increased slightly in width towards its posterior portion, 0.029–0.031 mm (0.030 mm) maximal width. Nerve ring 0.120–0.160 mm (0.143 mm) from head end. Intestine attaches straight nearly to rectum. Anus opens on ventral surface rising gently 0.039–0.043 mm (0.040 mm) from tail end; body length/length of tail 37.9–54.7 (47.6). Vulva situates 1.113–1.354 mm (1.252 mm), 63.7–68.5 % (66.2 %) per body length, from head end. A pair of labiate elevations transversely surrounds the opened vulva. Uterus opens directly on vulva, divergent oppositely, and connected through short oviducts with comparatively thick wall to ovaries. Anterior and posterior ovaries long, reflex respectively at 0.037–0.055 mm (0.043 mm) from end of esophagus and 0.019–0.059 mm (0.046 mm) from anus, and each ovary twists spirally once and reaches to the level of vulva. The terminal portion of the ovaries overlap, and end at a position anterior to vulva. Eight–21 (14.5) eggs in various divided cell stages arrange in a single row in the uterus. Uterine eggs elliptical, thin-shelled, 0.039–0.056 mm (0.046 mm) ×0.024–0.033 mm (0.027 mm).

Remarks: Seven species of avian *Strongyloides* described up to the present are shown in table. CRAM (1936) suggested that *S. oswaldoi* may be the same species as *S. avium*, because the range of variation in dimensions of Puerto Rican specimens was found to embrace descriptions of specimens of the two avian species of *Strongyloides*. FREITAS &
### Table List of avian Strongyloides

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>HOST</th>
<th>HABITAT</th>
<th>LOCALITY</th>
<th>AUTHOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. avium</em></td>
<td><em>Gallus g. domesticus</em></td>
<td>Caecum</td>
<td>U.S.A.*</td>
<td>Cram (1929)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intestine, Caecum</td>
<td>Puerto Rico</td>
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<td></td>
<td></td>
<td>Intestine</td>
<td>Cuba</td>
<td>Pérez Vigueras (1930)</td>
</tr>
<tr>
<td></td>
<td><em>Junco h. hyemalis</em></td>
<td>''</td>
<td>U.S.A.</td>
<td>Cram (1930)</td>
</tr>
<tr>
<td><em>S. fulica</em></td>
<td><em>Fulica americana</em></td>
<td>Intestine, Caecum</td>
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<tr>
<td></td>
<td><em>Colinus virginianus</em></td>
<td>Intestine</td>
<td>(Experimental case)</td>
<td>'' (1929)</td>
</tr>
<tr>
<td></td>
<td><em>Bonasa umbellus</em></td>
<td>Caecum</td>
<td>''</td>
<td>'' (1930)</td>
</tr>
<tr>
<td></td>
<td><em>Meleagris gallopavo</em></td>
<td>''</td>
<td>''</td>
<td>'' (1931)</td>
</tr>
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<td><em>S. oswaldoi</em></td>
<td><em>Gallus g. domesticus</em></td>
<td>Intestine</td>
<td>Brazil</td>
<td>Travassos (1930), Almeida (1933)</td>
</tr>
<tr>
<td><em>S. minimus</em></td>
<td><em>Dafila bahamensis</em></td>
<td>Colon, Caecum, Intestine</td>
<td>''</td>
<td>Freitas &amp; Almeida (1936)</td>
</tr>
<tr>
<td><em>S. cubensis</em></td>
<td><em>Butorides virescens</em></td>
<td>''</td>
<td>Cuba</td>
<td>Travassos (1930)</td>
</tr>
<tr>
<td><em>S. turkmenicus</em></td>
<td><em>Himantopus candidus</em></td>
<td>Intestine</td>
<td>Russia</td>
<td>Pérez Vigueras (1942)</td>
</tr>
<tr>
<td><em>S. ardeae</em></td>
<td><em>Nyctanassa violacea</em></td>
<td>''</td>
<td>U.S.A.</td>
<td>Little (1966)</td>
</tr>
<tr>
<td><em>S. herodiae</em></td>
<td><em>Ardea h. herodius</em></td>
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<td>''</td>
<td>Boyd *</td>
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<tr>
<td><em>S. sp.</em></td>
<td>Otididae (Bustards)</td>
<td>?</td>
<td>Egypt</td>
<td>Baylis (1923)</td>
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<td>Intestine</td>
<td>Indonesia</td>
<td>Noto-Soedio (1933)</td>
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<td><em>Pavo m. muticus</em></td>
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<td>Japan</td>
<td>Sakamoto &amp; Takahashi (1963)</td>
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<td><em>Pavo c. cristatus</em></td>
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<td>(Experimental case)</td>
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<td></td>
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<td>''</td>
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<tr>
<td></td>
<td><em>Agelaius phoeniceus</em></td>
<td>?</td>
<td>U.S.A.</td>
<td>Little (1966)</td>
</tr>
</tbody>
</table>

* including both spontaneous and experimental cases
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Almeida (1936) stated that *S. oswaldoi* is considered to be synonymous with *S. avium*, for dimensional differences of various body parts between both species was not recognized. Accordingly, the avian *Strongyloides* are thought to consists of six species at the present. The body length of the subject specimen is shorter than that of *S. avium* described by Cram (1929, '36). It is, however, approximately the same body length, 2.2 mm, in Cram's description (1929) of the type specimen of *S. avium*. Some uterine eggs with shorter major axis in comparison with that of *S. avium* are recognized in the subject specimens. The reason for this difference is thought to be that the major axis of some eggs inclining in the uteri look shorter than the true length. The dimensions of various parts of the body in the subject specimens, except for the above, bear a close resemblance to *S. avium* as reported by Cram (1929, '36). The parasites, consequently, are identified as *Strongyloides avium* Cram, 1929. This report is thought to be the first record of *S. avium* in Japan and also the first record of a new host.

ACKNOWLEDGMENT

The authors wish to express their cordial thanks to Prof. J. Yamashita of this Department for his kind advice in this study.
REFERENCES


EXPLANATION OF PLATES

PLATE I

Parasitic female of *Strongyloides avium*

Fig. 1 Anterior end
Fig. 2 Vulval region
Fig. 3 Posterior end
Figs. 4 & 5 Whole body
PLATE II

Parasitic female of Strongyloides avium

Fig. 6 Whole body  $\times 63$
Fig. 7 Vulval region  $\times 650$
Fig. 8 Anterior end  $\times 650$
Fig. 9 Posterior end; lateral view  $\times 320$
Fig. 10 Posterior end; ventral view  $\times 320$