New Records of Parasitic Nematodes
from Five Species of the Order Anseriformes in Hokkaido, Japan

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ABSTRACT. Seven species of the order Anseriformes (Mergus merganser, Melanitta nigra, Anas platyrhynchos, A. crecca, Aix galericulata, Cygnus bewickii, and C. cygnus), collected in Hokkaido, Japan, were examined helminthologically in order to obtain parasitic nematodes. A total of five nematode species was obtained. These were: Pseudocapillaria mergi (from A. crecca and C. cygnus), Contracaecum sp. (from M. merganser), Amidostomum anseris (from A. platyrhynchos, C. bewickii and C. cygnus), Tetramerides fissipina (from A. platyrhynchos), and Physaloptera sp. (from A. crecca). The records of both P. mergi and A. anseris were the first from Japan, while the records of T. fissipina and Physaloptera sp. involved new hosts. Among these five nematodes, A. anseris seems to be one of the most common occurring among the Anatidae of Hokkaido.

Key Words : Anseriformes, Pseudocapillaria mergi, Amidostomum anseris, Tetramerides fissipina, first record, Japan

INTRODUCTION

Although the trematodes and cestodes hosted by species in the order Anseriformes (Aves) (including domestic ducks) in Japan have been widely reported, the parasitic nematode fauna of the Anseriformes in this region is not well-known. Previously, seven nematode genera have been reported: Capillaria, Eustrongylides, Contracaecum, Ascaridia, Heterakis, Echinuria, and Sarconema [1-4] from Japan, although all of them have been did from the islands of Kyushu and Honshu. There have been no previous reports of such parasitic nematodes from Hokkaido, despite this northern part of the Japanese Archipelago being on the EastAsian flyway used by many species of migratory waterfowl. In order to address this gap in our knowledge, the present authors examined several waterfowl species in Hokkaido helminthologically to obtain parasitic nematodes.
birds were brought to the laboratory for necropsy.

The gastric tracts (stomachs, small and large intestines, and other viscera) of all thirty birds were examined parasitologically. The parasitic nematodes recovered were stored in either 70 % ethanol or 10 % formalin solution and examined microscopically in a lacto-phenol solution. Some trichos-trongylids were sectioned with a razor for observation of the synlophe. These nematodes were measured and illustrated with the aid of a camera lucida. The specimens have been deposited in the Faculty of Veterinary Medicine, Rakuno Gakuen University, Hokkaido, Japan, and in the Meguro Parasitological Museum, Tokyo, Japan.

Five nematode species were obtained from nine of the above 30 birds examined during this investigation (Table 1): Pseudocapillaria mergi (Madsen 1945) (Capillaridae; from the small intestines of A. crecca and C. cygnus) (Figs. 2); Contracaecum sp. cf. Yamaguti 1941 (Anisakidae; from the stomach of M. merganser) (Figs. 3); Amidostomum anseris (Zeder 1800) (Amidostomatidae; from the stomachs of A. platyrhynchos, C. bewickii and C. cygnus) (Figs. 4 and 5-1 to 5-3); Tetrameres fissispina (Diesing 1861) (Tetrameridae; from the stomach of A. platyrhynchos) (Figs. 5-4 and 5-5, and 6-1 to 6-3);

A total of 30 birds of seven waterfowl species were collected from various localities (Table 1 and Fig. 1) in Hokkaido, Japan, from 1995 to 1998; all

Table 1. Occurrence of parasitic nematodes from waterfowl in Hokkaido, Japan.

<table>
<thead>
<tr>
<th>Localities*</th>
<th>Hosts**</th>
<th>Cc</th>
<th>MnAp</th>
<th>MmApAcAg</th>
<th>ApCc</th>
<th>Cc</th>
<th>CbCc</th>
<th>Cb</th>
<th>Ag</th>
<th>Cb</th>
<th>ApAc</th>
<th>No. of birds exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hakodate, 2 Sapporo, 3 Ebetsu, 4 Tomakomai, 5 Chitose, 6 Bibai, 7 Mikasa, 8 Asahikawa, 9 Hamatom-betsu, 10 Shibecha.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Pseudocapillaria mergi</th>
<th>Contracaecum sp.</th>
<th>Amidostomum anseris</th>
<th>Tetrameres fissispina</th>
<th>Physaloptera sp.</th>
<th>Nematode free</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>1</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>26</td>
</tr>
</tbody>
</table>


**Abbreviations of bird species examined. Mn = Mergus merganser, Mn = Melanitta nigra, Ap = Anas platyrhynchos, Ac = A. crecca, Ag = Aix galericulata, Cb = Cygnus bewickii, and Cc = C. cygnus.

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Fig. 2. *Pseudocapillaria mergi* (Madsen 1945)
1: Stichocytes (Bar=0.05 mm),
2: Posterior extremity of male (Bar=0.01 mm), right-lateral view,
3: Vulva of female, right-lateral view (Bar=0.01 mm)

Fig. 3. * Contracaecum* sp. cf. Yamaguti 1941
1: Anterior extremity with interlabia (arrow) (Bar=0.1 mm),
2: Base of oesophagus with oblong posterior ventriculus and intestinal caecum (Bar = 0.1 mm)
3: Posterior extremity of male, right-lateral view (Bar=0.1 mm).
and Physaloptera sp. (Family Physalopteridae; from the stomach of A. crecca) (Figs. 5-6 to 5-8 and 6-4 to 6-6).

Although three capillarid species have previously been reported from Anatidae from Honshu (Capillaria anatis, C. nyrocinarum, and Eucoleus contortus [1,2]), the present record of the genus Pseudocapillaria is obtained from the Anatidae in Japan. One of the remarkable morphological characters of the genus Pseudocapillaria is its non-spiny spicular...
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Fig. 5. Amidostomum anseris (Zeder 1800) (5-1 to 3), Tetramerex fissipina (Diesing 1861) (5-4 and 5), Physaloptera sp. 5-6 to 5-8). 5-1, 4, 6 and 7 Anterior extremity of male 5-2, 3, 5 and 8 Posterior extremity of male (Bar=0.1 mm).

Yamaguti [7] reported Contracaecum sp. (possibly referable to C. turkestanicum) as having been obtained from Mergus merganser merganser collected in Gifu Prefecture. The present nematode is likely to be the Yamaguti's anonym species because of the accordance of both the host species and the general measurements (male: Body 15-34×0.45-1.0 mm, headshort, 0.125-0.21 mm diameter; lips 60-110 μ long, each with a plump medial and tow small anteromedial lobes; interlabia arched inwards, 42-100 μ long, containing slender pulp. Nerve ring and cervical papillae 0.38-0.63 mm and 0.42-0.65 mm respectively from head end. Esophagus 2-4×0.15-0.25 mm, ventriculus 0.15-0.2×0.13-0.2 mm, ventricular appendix 0.5-1.1 mm long; intestinal caecum 1.5-2.9 mm long. Tail conical, 0.13-0.25 mm long. Spicules equal, alate, 3.4-5.8 mm long. Preanal papillae in 28-34 pairs, first pair 3.0-7.1 mm from cloacal aperture).

Species in the genus Amidostomum are the most common parasites found in aquatic birds of the
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Fig. 6. Tetrameres fissispina (Diesing 1861) (6-1 to 3), and Physaloptera sp. (6-4 to 6).
6-1, 4 and 5 Anterior extremity of male, lateral view (Bar=0.05 mm).
6-2 Mid-body (Bar=0.05 mm).
6-3 and 6 Posterior extremity of male (Bars= 0.05 mm and 0.01 mm, respectively)

Palaearctic Region. Three species of this genus commonly parasitize the order Anseriformes, *A. anseris*, *A. orientale*, and *A. aculum* [8]. Specimens obtained during the present study were identified as *A. anseris* because on the basis that the buccal capsule had three teeth (Fig. 5-1: cf. the buccal capsules of the other species with just one tooth). Although this is actually the first record of the genus *Amidostomum* from Japan, it is evident that *A. anseris* is one of the most common nematode parasites among the Anatidae visiting Hokkaido because it was found from three waterfowl species at five localities.

The records of *Tetrameres fissispina* and *Physaloptera* sp. were both firsts from Anatidae in Japan, although they have previously been obtained
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from the other avian groups in Japan [4].

要纲
カモ目の寄生線虫相を明らかにする目的で、北海道内の
野生から採集されたカワアイサ Mergus merganser.
クロガモ Melanitta nigra, マガモ Anas platyrhynchos, コガモ
A. crecca, オンドリ Aix galericulata, コハクチョウ Cygnus bewickii
およびオオハクチョウ C. cygnus の消化管を検査した。
その結果, Pseudocapillaria mergi (宿主: コガモ, オオハクチョウ),
Contracaecum sp. (宿主: カワアイサ),
Amidostomum anseris (宿主: マガモ, コハクチョウ, オオハクチョウ),
Tetrameres fissipina (宿主: マガモ) および Physaloptera sp. (宿主: コガモ) の
5 種の線虫が検出された。P. mergi と A. anseris は日本初記録,
T. fissipina と Physaloptera sp. はそれぞれの宿主種で
初めての記載であった。また、道内で広範に分布することを
および宿主域が広いことから, A. anseris はカモ目に普通
の寄生虫であることが示唆された。
キーワード: カモ目, Pseudocapillaria mergi, Amidostomum anseris, Tetrameres fissipina, 国内初記録

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