

Parasitic Helminths from Exhibited Avian Species Kept in Kinki District in Japan

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近畿地方で飼育された展示鳥類の寄生蠕虫類

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ABSTRACT. To undertake diagnoses, parasitic helminths from 22 captive avian species kept in 5 zoological gardens and/or exhibition facilities in Kinki District in Japan were examined, and 17 species, namely *Chapmania tauricollis*, *Clinostomum complanatum*, *Corynosoma* sp., Capillariidae gen. sp., *Thelazia aquillina*, *Synhimantus* (S.) sp., *S. (Dispharynx) nasuta*, *Desportesius invaginatus*, *Diplotriciaena ozouxi*, *Contracecum* sp., *Heterakis isolonche*, *Heterakis* sp., *Pseudaspidodera* sp., *Ascaridia gallinarum*, *A. hermaphrodita*, *Ascaridia* sp. and *Syngamus* sp., were identified. This is the first record of *C. tauricollis* and *Pseudaspidodera* sp. in Japan. An case of abnormal cordon of *S. (Dispharynx) nasuta* was recorded. As well, a brief epidemiological discussion of the genera *Corynosoma* and *Heterakis* was presented.

Key words : Captive birds, helminths, Japan

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INTRODUCTION

Uchida et al. [1] and Hasegawa and Asakawa [2] listed about 400 helminth species obtained from Japanese birds, including domestic fowl and experimental hosts, and several cases of helminthiasis, including fatal ones, have been reported in Japan [3, 4]. Among them, cases involving captive and/or wild avian species kept in zoological gardens or breeding centers were reported, but since there are very few reports about the cases in captivity [5-10], it is difficult to provide an epidemiological overview of parasitic diseases of the birds

excluding the case of ratites [11]. Effective prevention of disease outbreaks needs to be based on such an overview. Fortunately, a co-operative project enable taxonomical studies on the parasitic helminths obtained from captive avian species kept in zoological gardens and/or exhibition facilities in Kinki District in western Japan. The occurrence of host pathogenic helminths among them are discussed from epidemiological viewpoint.

MATERIALS AND METHODS

Parasitic helminths were obtained from captive and/or wild

birds in Osaka Municipal Tennoji Zoo (abbreviated as [o]), Kobe Oji Zoo [k], Takarazuka Zoological and Botanical Gardens [t], Koshien Zoological and Botanical Gardens [kz], and Hyogo Prefectural Homeland for the Oriental White Stork [h] between 1979 and 2003. Their avian hosts were 22 species; namely *Ardea cinerea* [k, h] (abbreviations of the zoological gardens noted above), *Bubulcus ibis* [o, k], *Nycticorax nycticorax* [k], *Egretta garzetta* [o], *Falco peregrinus* [k], *Chrysolophus pictus* [k, t], *Ciconia boyciana* [h], *Crossoptilon auritum* [k], *Pavo cristatus* [o], *Pucarasia macrolopha* [o], *Lophortyx californica* [o], *Alectoris philbyi* [o], *Tragopan satyra* [o], *Lyrurus tetrix* [o], *Platycercus eximius* [k], *Amazona autumnalis salvini* [k], *A. defresniana* [k], *Centropus bengalensis* [k], *Phalacrocorax carbo* [o], *Charadrius hiaticula* [o], *Phasiaus colchius* [kz], and *Anthropoides paradisea* [o]. In the present study, each two *P. minor*, *A. philbyi*, *P. eximius* and *A. gouldiae*, and each one bird individual of the other species were treated. Hence, total number of the host individuals processed in the present study were 26 (AS Nos 3498 to 3523), and their helminths are deposited in the Wild Animal Medical Center, Rakuno Gakuen University, Hokkaido, Japan.

All specimens had been preserved in 5 or 10 % formalin solution. After cestodes were stained with aceto-carmin and nematodes were cleared with lacto-phenol solution, they were examined microscopically.

RESULTS AND DISCUSSION

In survey of the preserved specimens, 17 species, namely *Chapmania tauricollis*, *Clinostomum complanatum*, *Corynosoma* sp., Capillariidae gen. sp., *Thelazia aquillina*, *Synhimantus* (S.) sp., *S. (Dispharynx) nasuta*, *Desportesius invaginatus*, *Diplotriaena ozouxi*, *Contracaecum* sp., *Heterakis isolonche*, *Heterakis* sp., *Pseudaspododera* sp., *Ascaridia gallinarum*, *A. hermaphrodita*, *Ascaridia* sp. and *Syngamus* sp., were identified, and their hosts and the zoological gardens they were obtained from are shown in Table 1.

Although there have been a lot of records about *Chapmania tauricollis* from wild and captive *Rhea americana* [11], this is the first record of the cestode species in Japan. Several mature proglottids of the species (Fig. 1) were obtained in the present study.

The genus *Corynosoma* is well known as one of the pathogens of severe enteritis including fatal cases in various captive and wild birds [4, 12]. From an epidemiological viewpoint, the parasitism was remarkable, because the present wild infected gray heron (*Ardea cinerea*) had shared its range with captive storks (*Ciconia ciconia*) under a breeding program of the storks at the zoological institute "h". The cage facility of the institute was under the semi-natural conditions including fresh water ponds, and both avian species could obtain invertebrates and fishes which could have been served as the intermediate hosts of the acanthocephalan species. The present helminthological result showed that the attention needs to be exercised regarding acanthocephalan parasitism in storks; however,

unfortunately, there is no effective agent against these worms [13]. Hence, prevention of the parasitism should be done by eliminating herons and suspicious intermediate host species from the facility.

Since *Heterakis* spp. were obtained from seven gallinaceous host species kept in four of the zoological gardens in the present survey, it is re-confirmed that the genus *Heterakis* should be taken into epidemiological consideration when keeping an avian group in western Japan; because the genus *Heterakis* excluding *H. isolonche* could be a transmitter of *Histomonas meleagridis* [12]. It has been reported that *H. isolonche* causes typhlitis with severe diarrhea, weight loss and depression with lymphocytic infiltration and granuloma formation from invading the intestines of the nematode larvae [12]. Among the present heterakids, this is first record of the genus *Pseudaspododera* in Japan. It is easy to identify the heterakids at the generic level because of the presence of cordons situated on the anterior extremity (Fig. 2).

The present detection of *Thelazia aquillina* was the second case of this species in Japan because the nematode was obtained from a captive stork of the institute "h" in 1998 [14,15]; hence, this nematode may be common in the institute.

The acuarids are one of the severe pathogen of birds with invading into stomach deeply, and their cordons are the most important taxonomical characteristics [16]. However, one individual among several nematode individuals of the present *Synhimantus (Dispharynx) nasuta* had an non-anastomosing cordon (Fig. 3), although normal worms of this subgenera have anastomosing cordons (Fig. 4).

Although *Diplotriaena falconis* was obtained from a captive red-legged falconet (*Microhierax caerulescens*) imported unlawfully from Thailand and died at Nagano Zoo in Japan [5], the *D. ozouxi* here is the first recorded case of this species in Japan. Further, a female *Diplotriaena* sp. has ever been obtained from a wild great tit (*Parus major*) captured in Hokkaido, Japan, in mid-September 2003 (Sato and Shirouzu, unpublished data). Hence, there is a possibility that the present case of this nematode species was derived from wild Japanese birds as well.

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要 約

Parasitic Helminths from Exhibited Avian Species

Table 1 Helminths obtained from captive and/or wild (*) avian species kept in zoological gardens of Kinki District in Japan from 1979 to 2003.

Parasitic helminths	Hosts (Abbreviation of Zoological Gardens)
Cestoda	
Order Davaineida	
Family Davaineidae	
<i>Chapmania tauricollis</i>	<i>Rhea americana</i> (k)
Trematoda	
Order Strigeatida	
Family Clinostomatidae	
<i>Clinostomum complanatum</i>	<i>Ardea cinerea</i> (h) *
Acanthocephala	
Order Echinorhynchida	
Family Polymorphidae	
<i>Corynosoma</i> sp.	<i>Ardea cinerea</i> (h) *
Nematoda	
Order Trichinellida	
Family Capillariidae	
Capillariidae gen. sp.	<i>Lyrurus tetrix</i> (o)
Order Rhabditida	
Superfamily Ascaridoidea	
Family Anisakidae	
<i>Contraecum</i> sp.	<i>Ardea cinerea</i> (k, h) *, <i>Bubulcus ibis</i> (o) *, <i>Egretta garzetta</i> (o) *, <i>Phalacrocorax carbo</i> (o) *
Superfamily Heterakoidea	
Family Heterakidae	
<i>Heterakis isolonche</i>	<i>Tragopan satyra</i> (o)
<i>Heterakis</i> sp.	<i>Alectoris philbyi</i> (o) , <i>Pucrasia macrolopha</i> (o) , <i>Chrysolophus pictus</i> (k) , <i>Crossoptilon auritum</i> (k) , <i>Chrysolophus amherstiae</i> (t) , <i>Phasianus colchicus</i> (kz) , <i>Pavo cristatus</i> (o)
<i>Pseudaspodera</i> sp.	
Family Ascaridiidae	
<i>Ascaridia gallinarum</i>	<i>Anthropoides paradisea</i> (o)
<i>A. hermaphrodita</i>	<i>Platycercus eximus</i> (k) , <i>Amazona defresniana</i> (k)
<i>Ascaridia</i> sp.	<i>Alectoris philbyi</i> (o) , <i>Nycticorax nycticorax</i> (k) *, <i>Amazona autumnalis salvini</i> (k) , <i>Centropus bengalensis</i> (k)
Superfamily Strongyloidea	
Family Strongylidae	
<i>Syngamus</i> sp.	<i>Alectoris philbyi</i> (o)
Superfamily Thelazoidea	
Family Thelaziidae	
<i>Thelazia aquillina</i>	<i>Ciconia boyciana</i> (h)
Superfamily Acuarioidea	
Family Acuariidae	
<i>Synhimantus</i> (S.) sp.	<i>Falco peregrinus</i> (k) *
<i>S. (Dispharynx) nasuta</i>	<i>Centropus bengalensis</i> (k)
<i>Desportesius invaginatus</i>	<i>Ardea cinerea</i> (k) *, <i>Bubulcus ibis</i> (k) *
Superfamily Diplostriaenoidea	
Family Diplostriaenidae	
<i>Diplostriaena ozouxi</i>	<i>Charadrius hiaticula</i> (o) *

Abbreviations of Zoos or Institute: o, Osaka Municipal Tennoji Zoo; k, Kobe Oji Zoo; t, Takarazuka Zoological and Botanical Gardens; kz, Koshien Zoological and Botanical Gardens; h, Hyogo Prefectural Homeland for the Oriental White Stork.

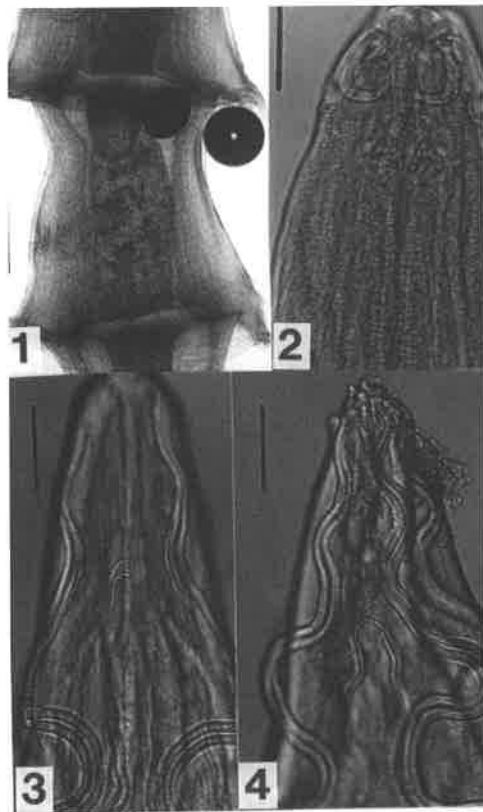


Fig. 1 Mature proglottids of *Chapmania tauricollis* from *Rhea americana* (bar = 1 mm) .

Fig. 2 Anterior extremity of *Pseudaspodera* sp. from *Pavo cristatus* (bar = 0.05 mm) .

Figs. 3 and 4 Anterior extremities of *Synhimantus* (*Dispharynx*) *nasuta* from *Centropus bengalensis* with non-anastomosing (3) and normal cordon (4) (bars = 0.1 mm) .

展示鳥類の寄生蠕虫類の侵淫状況を知る基礎情報の一つとして、近畿地方で地理的に近接する動物園および関連施設で、展示あるいは保護収容された22種の鳥類から検出、保存されていた寄生蠕虫類を同定した。その結果、17種の蠕虫類 (*Chapmania tauricollis*, *Clinostomum complanatum*, *Corynosoma* sp., *Capillariidae* gen. sp., *Thelazia aquillina*, *Synhimantus* (*S.*) sp., *S. (Dispharynx) nasuta*, *Desportesius invaginatus*, *Diplotriaena ozouxi*, *Contracaecum* sp., *Heterakis isolonche*, *Heterakis* sp., *Pseudaspodera* sp., *Ascaridia gallinarum*, *A. hermaphrodita*, *Ascaridia* sp. および *Syngamus* sp.) の寄生が確認された。また、*S. (Dispharynx) nasuta* の一虫体にコルドンが吻合していない異常型を記録した。さらに、レア *Rhea*

americana に寄生していた条虫 *C. tauricollis* は日本における新記録であった。また、鉤頭虫 *Corynosoma* 属と線虫 *Heterakis* 属について若干の疫学的論議を行った。

キーワード：展示鳥類，蠕虫，日本

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