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【Article】

First record of the genus *Strongyloides* (Nematoda : Rhabditoidea) obtained from a fairy pitta, *Pitta brachyura nympha*

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Abstract : Two young individuals of fairy pitta, *Pitta brachyura nympha*, were rescued somewhere within Kochi Prefecture, Shikoku, Japan, and housed at the Wanpark Kochi Animal Land, Kochi city. Each died suddenly, on May 31, 2008 and January 23, 2011, respectively. In the postmortem and helminthological examinations, four female parasitic nematode specimens were obtained from the small intestine of one of the birds. They were identified as *Strongyloides* sp. based on morphological characters. Several species of the genus *Strongyloides* have been recorded from wild birds and domestic poultry worldwide, including in Japan, but this is the first record of the nematode genus *Strongyloides* from *P. b. nympha*. We could not definitively identify the present specimens to species because they had not formed matured eggs.
Key words : new host record, parasitology, passerine birds, *Strongyloides* sp.

Introduction

The fairy pitta, *Pitta brachyura* nympha Temminck and Schlegel, 1850 (Passeriformes : Pittidae), is distributed in warm-temperate broadleaved forests of East Asia. They migrate between southeast Asia, where they overwinter, to their summer breeding sites in northeast Asia, including the Japanese islands of Honshu, Shikoku, Kyushu, and Tsushima. They feed on several species of invertebrates, but mainly on earthworms on the forest floor (Yamaguchi and Kamogawa, 1971, 1972 ; Sawada, 1984 ; Fujita *et al*., 1992 ; Minamiya *et al*., 2007). Fairy pitta is classified as 1B on the endangered species list (EN : Endangered) in the Japanese Red Data Book. Current estimates suggest a population size of about 150 individuals (Wildlife Division of the Ministry of the Environment, 2002).

In conservation projects in which wild birds are returned to free-living conditions, health risk assessments are important to avoid detrimental parasitic disease outbreaks, such as fatal helminthiasis (Friend and Franson 1999 ; Asakawa *et al*., 2002). However, there is little information regarding the disease-causing agents, including parasitic helminths, in this species. We therefore investigated the parasites of *P. b. nympha*.

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Materials and Methods

Two young individuals of fairy pitta were rescued in Kochi Prefecture and housed in a captive facility of the zoo, Wanpark Kochi Animal Land, Kochi, Japan. They died suddenly, one on May 31, and the other 2008 on January 23, 2011. Postmortem examinations were performed in the zoo. The digestive tracts of the birds were fixed in 70% ethanol and taken to the Wild Animal Medical Center (WAMC) of Rakuno Gakuen University, Hokkaido, Japan for helminthological examination. A total of four female parasitic nematode specimens were recovered from the small intestine of one of the pittas. The fixed nematode specimens were cleared in lacto-phenol solution for microscopic observation. Morphological and biometric data were recorded using a camera lucida (OLYMPUS DP 20). The nematode specimens are preserved separately in the WAMC (WAMC-As 11031) and the Tokushima Prefectural Museum, Tokushima, Japan (TKPM-IV551).

Results and Discussion

The nematodes isolated from the fairy pitta specimen were identified as *Strongyloides* sp. (Strongyloididae) based on morphological characters according to the criteria of Anderson and Bain (1982), Spaere (1989) and Skrjabin (1992). The nematodes had the following characters : body threadlike and equipped uninflated cuticle ; buccal cavity reduced and without teeth ; esophagus long, slender and without terminal valved bulb ; vulva in posterior of body. Morphological characters and measurements are given in Fig. 1 and Table 1.

Rhabditid nematodes belonging to the genus *Strongyloides* Grassi, 1879 have been identified so far from several avian hosts worldwide, mainly Galliformes (including poultry), Anseriformes, Ciconiiformes and Charadriiformes (Barus *et al*., 1978 ; Spaere, 1989 ; Skrjabin, 1992). However, few specimens of this genus have been reported from Japan or from Passeriformes. Three species of

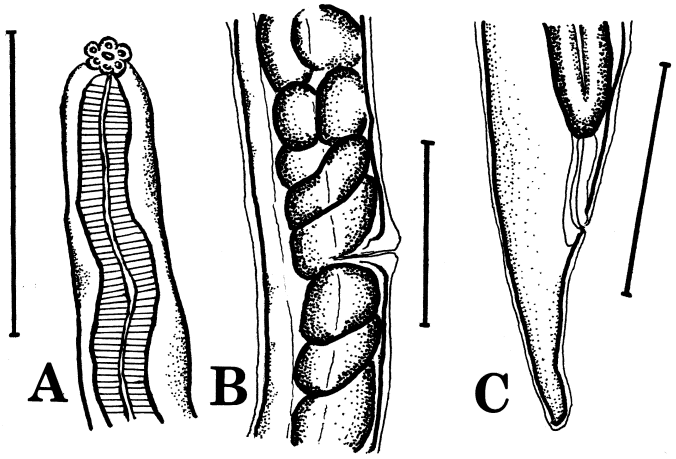

Figure 1. Parasitic female of *Strongyloides* sp. obtained from a fairy pitta. A, anterior extremity ; B, vulva ; C, posterior extremity. Scale bar=50μm

Table 1. Measurements of the parasitic female of Strongyloides spp. (in mm)

	Strongyloides sp.	*S. avium*		*S. minimum*	*S. cubaensis*	*S. turkmenicus*	*S. ardeae*	*S. herodiae*	*S. pavonis*
	present specimen	Cram (1929)	Sakamoto and Sarashina (1968)	Travassos (1930)	Perez Vigueras (1942)	Kurtieva (1954)	Little (1966)	Boyd (1966)	Sakamoto and Yamashita (1970)
Body Length(mm)	1.5-1.9 (1.69)	2.2	1.6-2.1	1.1-1.8	2.2-2.4	1.7-2.1	1.5-2.1	2.4-2.8	2.7-4.2 (3.41)
Body Width	42-50(46.0)	40-55	38-46	37-40	42-50	33-45	30-40	32-36	43-60 (50)
Body Length/ Body Width	33.9-38.3 (36.3)	49-55	35.4-54.7	–	–	–	–	–	54-95 (68.2)
Length of Esophagus	410-470 (440.0)	700	475-675	512-550	540-560	381-554	480-780	530-660	725-915 (800.0)
Body Length/ Esophagus Length	3.7-4.1 (3.90)	3.15	2.9-4.5	–	–	–	–	–	3.5-5.2 (4.3)
Distance of Vuva from anterior end	900-1130 (1020.0)	1400	1113-1354	–	–	920-1220	–	1470-1730	1690-2500 (2090.0)
Ratio to Body Length (%)	59.3-63.2 (60.4)	63.7	63.7-68.5	–	–	–	–	–	59.0-65.3 (61.1)
Tail Length	35-42 (39.0)	55	39-43	50	70-76	42-49	30-50	48-53	51-75 (62.0)
Body Length/ Tail Length	40.3-45.7 (43.50)	40	37.9-54.7	22.5-35.6	–	–	–	–	317-78.9 (56.30)
Egg size	–	52-56 x 36-40	39-56 x 24-33	50 x 28	–	35-42 x 21-24	–	48 x 27	50-54 x 35-40

the genus *Strongyloides* have been recorded from wild and/or captive birds in Japan : *S. avium* Cram, 1929 from water rail, *Rallus aquaticus indicus* Blyth, 1849 ; *S. pavonis* Sakamoto and Yamashita, 1970 from green peafowl, *Pavo muticus* Linnaeus, 1766, Indian peafowl, *P. cristatus* Linnaeus, 1758, and domestic chicken, *Gallus gallus domesticus* Linnaeus, 1758 ; and *Strongyloides* sp. from the Okinawa rail *Gallirallus okinawae* (Yamashina and Mano, 1981) (Sakamoto and Sarashina, 1968 ; Sakamoto and Yamashita, 1970 ; Onuma *et al*., 2011). Worldwide, several species have been recorded from wild and captive birds : *S. turkumenicus* Kurtieva, 1953 from *Himantopus himantopus* (Linnaeus, 1758) and *Larus canus* Linnaeus, 1758 ; *S. minimum* Travassos, 1930 from *Anas bahamensis* Linnaeus, 1758 ; *S. cubaensis* Perez Vigueras, 1942 from *Butorides virescence* (Linnaeus, 1758) ; *S. ardeae* Little, 1966 from *Nyctanassa violacea* (Linnaeus, 1758) and *B. virescence* ; *S. herodiae* Boyd, 1966 from *Ardea herodias* Linnaeus, 1758 ; and *Strongyloides* sp. from *Agelaius phoeniceus* (Linnaeus, 1766) and domestic chicken (Baylis, 1923 ; Cram, 1929 ; Travassos, 1930a, 1930b ; Cram, 1936 ; Pelez Vigueras, 1936 ; Kurtieva, 1954 ; Boyd, 1966 ; Little, 1966a, 1966b ; Barus *et al*., 1978).

Although the morphological characters of the specimens taken from the fairy pitta seemed to be closely allied to *S. avium*, we could not definitively identify them because they had not formed matured eggs (Cram, 1929 ; Sakamoto and Sarashina, 1968 ; Sato *et al*., 2008). More detailed analyses, such as a genetic study or electron microscopy, will be required to identify them (Sato *et al*., 2008 ; Hasegawa *et al*., 2009).

Only one nematode species, *Aproctella tuberculata* Ramnivas, 1979, had previously been reported from the fairy pitta, but there was no prior record of nematodes belonging to the genus *Strongyloides* from this bird (Ramnivas, 1979). This is the first record of *Strongyloides* from *P. b. nympha* on worldwide basis.

The postmortem examinations did not determine the causes of death of the two pittas, and there was no evidence of pathogenicity caused by the nematodes. However, nematodes belonging to the genus *Strongyloides* are well-known pathogenic agents that cause thickening of the cecal wall and filling of the cecal lumen with desquamated debris of degenerated tissue, mucous exudation, and blood (Cram, 1929 ; Sakamoto, 1982). Thus, we suggest that this nematode may cause epizootic infections and pathogenicity in these hosts.

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摘　要

ヤイロチョウ *Pitta brachyura nympha* から得られた *Strongyloides* 属線虫の初記録

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高知県内某所で保護され，収容先の動物園で死亡したヤイロチョウ 2 個体の消化管を検査したところ，1 個体の腸管から 4 体の線虫が検出された．線虫は形態学的に糞線虫類の *Strongyloides* 属（Rhabditoidea 上科）に属すると考えられた．日本を含む世界各地の野鳥，飼育鳥類及び家禽からは今までに 7 種ほどの報告があるが，今回の標本は卵形成が十分ではなかったため，種の決定は見送られた．ヤイロチョウからの本属線虫の記録は無く，今回が初報告となった．

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