

## The First Report of Parasitic Nematodes of *Apodemus* spp. (Muridae: Rodentia) Collected on Ohsumi Islands, Kagoshima Pref., Japan

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**Abstract.** The parasitic nematodes of *Apodemus speciosus* [As: Abbreviation of host name] and *A. argenteus* [Aa] (Murinae: Muridae: Rodentia) collected on Yaku-shima I., Tanega-shima I., and Kuchinoerabu-jima I., southern part of Japan, were investigated. Total number of the mice examined is 38 individuals of As and 36 individuals of Aa collected on Yaku-shima I., 27 individuals of As and 5 individuals of Aa collected on Tanega-shima I., and 2 individuals of As collected on Kuchinoerabu-jima I., respectively. Nine nematode species were obtained from Yaku-shima I., viz., *Heligmonoides speciosus* [Hosts: As, Aa], *Syphacia emileromani* [Aa], *Syphacia* sp. [larval form] [Aa], *Heterakis spumosa* [As], *Subulura (Murisubulura) suzukii* [As], *Rictularia cristata* [As, Aa], *Mastophorus muris* [Aa], *Rhabditis (Pelodera) orbitalis* [3rd larva] [As], and *Capillariidae* gen. sp. [Aa]. On the other hand, 6 nematode species were obtained from Tanega-shima I., viz., *H. speciosus* [As, Aa], *S. emileromani* [Aa], *S. (M.) suzukii* [As, Aa], *R. cristata* [As, Aa], *M. muris* [As, Aa] and *Gongylonema (Gongylonema) neoplasticum* [As], and only 1 species, *H. speciosus*, was obtained from Kuchinoerabu-jima I. [As]. There are several studies on the parasitic nematodes of the genus *Apodemus* of Kyushu and its surrounding offshore islands. However, this is the first report of the nematodes from Yaku-shima I., Tanega-shima I. and Kuchinoerabu-jima I.. These nematodes are common with those of mainlands of Japanese Islands although Ohsumi Is. are thought to have been isolated from Kyushu between 100,000 and 130,000 years ago.

**Key words:** Parasitic nematodes, *Apodemus* spp., Yaku-shima I., Tanega-shima I., Kuchinoerabu-jima I., Japan.

### Introduction

As part of a zoogeographical research project (Asakawa, 1995), an analysis was made on the parasitic nematode fauna of Japanese field and wood mice, *Apodemus speciosus* (Temminck) and *A. argenteus* (Temminck) (Murinae: Muridae: Roden-

tia), collected on 3 offshore islands belonging to Ohsumi Islands, Kagoshima Prefecture, Japan, namely Yaku-shima I., Tanega-shima I. and Kuchinoerabu-jima I., which are thought to have been isolated from Kyushu between 100,000 and 130,000 years ago (Ohshima, 1990) because there is no investigation on the occurrence and distribution of the

islands. In the present paper, we report the results of a nematode survey of the field mice collected on Ohsumi Is.

### Materials and methods

Host animals (*Apodemus speciosus* and *A. argenteus*) for the materials were shown below 1)~3). 1) Host animals collected during 23 to 28, March, 1996, are 67 from 6 points of Yaku-shima and Tanega-shima Is., viz., Hirano [1: Each number in parentheses showing collection points in Fig. 1], Hirauchi [2], Nagata I [3] and Kusakawa [4] on Yaku-shima I., and Kakinaga [7] and Sumiyoshi [8] on Tanega-shima I., respectively. The vegetation of these points was described in Asakawa (1996), and the total number of the mice collected on Yaku-shima

and Tanega-shima Is. is shown in Table 1. These mice were collected by M. Asakawa, one of the present authors, and the whole bodies of the mice have been kept in 10% formalin solution with a specimen label. The parasitological examination on the materials was performed with the whole bodies including its eyes, muscle, lungs, and all viscera. 2) Host animals collected during 14 and 15, July, 1995, are 1 individual of *A. argenteus* from Nagata II [5] of Yaku-shima I., and 1 individual of *A. speciosus* from Motomura I [9] of Kuchinoerabu-jima I.. These mice were collected by M. Motokawa, one of the present authors, and their stomachs and intestines were kept in 10 % formalin solution for the parasitological examination. 3) Host animals collected during 29 April to 1 May, 1994, are 22 individuals of *A. argenteus* from Anboh [6] of Yaku-

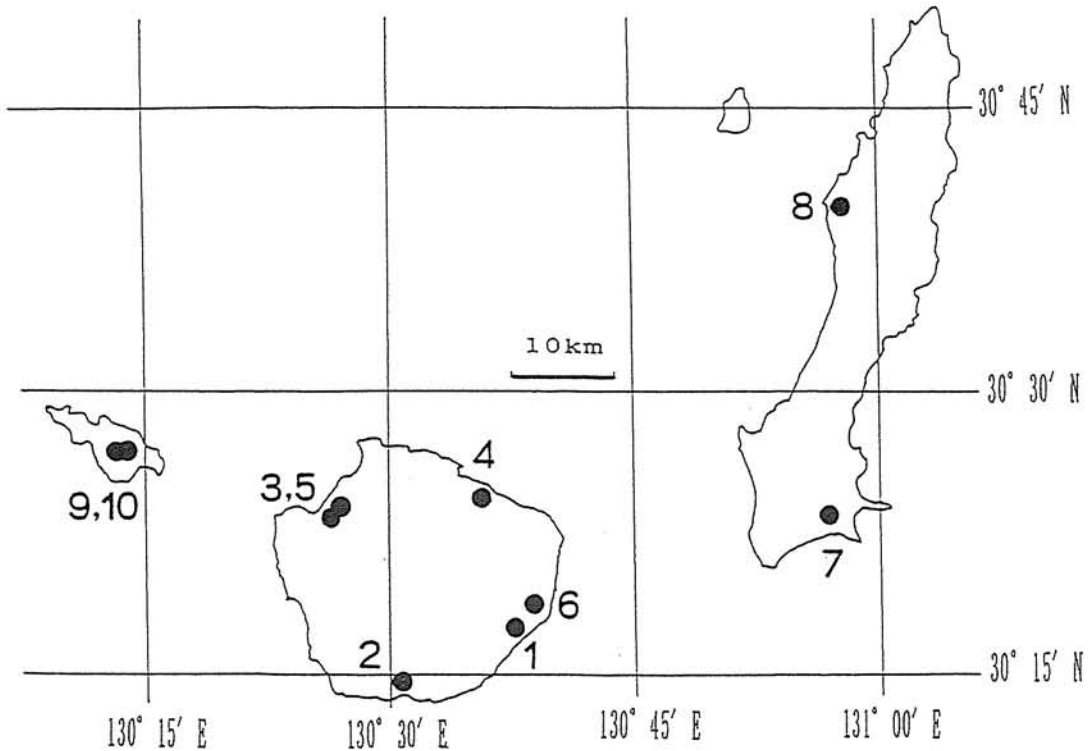


Fig. 1. Collection points on Ohsumi Is. 1-6: Points of Yaku-shima I.; 1: Hirano; 2: Hirauchi; 3: Nagata I; 4: Kusakawa; 5: Nagata II; 6: Anboh 7 and 8: Points of Tanega-shima I.; 7: Kakinaga; 8: Sumiyoshi. 9 and 10: Kuchinoerabu-jima I.; 9: Motomura I; 10: Motomura II.

Table 1. Occurrence of parasitic nematodes on Yaku-shima and Tanega-shima Is., Japan.

Parasitic nematodes	Yaku-shima I.						Tanega-shima I.			
	1 <sup>1)</sup>	2	3	4	5	6	Total	7	8	Total
	As <sup>2)</sup> Aa	As	As Aa	As Aa	Aa	Aa	As Aa	As Aa	As Aa	AsAa
	4 <sup>3)</sup> 4	4	23 2	7 7	1	22	38 36	11 4	16 1	27 5
<i>Heligmonoides speciosus</i>	4 4	4	23 2	7 7	1	21	38 35	11 4	16 1	27 5
<i>Syphacia emileromani</i>	0 4	0	0 1	0 2	1	5	0 10	0 0	0 1	0 1
<i>Syphacia</i> sp.	0 0	0	0 1	0 1	0	1	0 2	0 0	0 0	0 0
<i>Heterakis spumosa</i>	1 0	0	7 0	0 0	0	0	8 0	0 0	0 0	0 0
<i>Subulura (M.) suzukii</i>	0 0	0	3 0	0 0	0	0	3 0	5 1	10 0	15 1
<i>Rictularia cristata</i>	0 0	0	1 0	0 1	0	6	1 7	3 1	0 0	3 1
<i>Mastophorus muris</i>	0 0	0	0 0	0 0	0	1	0 1	4 0	3 0	7 0
<i>Rhabditis (P.) orbitalis</i>	0 0	0	5 0	0 0	0	0	5 0	0 0	0 0	0 0
<i>Gongylonema (G.) neoplasticum</i>	0 0	0	0 0	0 0	0	0	0 0	1 0	0 0	1 0
Capillariidae gen. sp.	0 0	0	0 0	0 0	0	2	0 2	0 0	0 0	0 0

1) 1~8 showing collection points on Yaku-shima and Tanega-shima Is.(cf. Fig. 1).

2) Abbreviations of host names. As, *Apodemus speciosus*; Aa, *A. argenteus*.

3) Total number of field mice examined.

shima I., and 1 individual of *A. speciosus* from Motomura II.[10] of Kuchinoerabu-jima I. These mice were collected by M. Harada, one of the present authors, and their stomachs and intestines were kept in 70 % ethanol for the parasitological examination.

After naked eye examination, the helminths were collected under a dissecting microscope. Nematodes were fixed and preserved in 10 % formalin solution or 70 % ethanol, and examined microscopically with lacto-phenol solution. Measuring and drawing of the nematodes were done with the aid of a camera lucida, OLYMPUS Model BH2-DA.

These specimens are deposited in the Department of Parasitology, School of Veterinary Medicine, Rakuno Gakuen University, Hokkaido, Japan.

## Results

1) Yaku-shima I. Following 5 nematode species were obtained from *A. speciosus*; *Heligmonoides speciosus* (Fam. Heligmonellidae; Site: small intestine), *Heterakis spumosa* (Heterakidae; caecum

and colon), *Subulura (Murisubulura) suzukii* (Subuluridae; caecum and colon), *Rictularia cristata* (Rictulariidae; stomach and small intestine), and *Rhabditis (Pelodera) orbitalis* [3rd larva] (Rhabditidae; orbit). And, following 4 nematode species were obtained from *A. argenteus*; *H. speciosus*, *Syphacia emileromani* (Oxyuridae; small and large intestine), *R. cristata*, and *Mastophorus muris* (Spiruridae; stomach). Furthermore, the larval forms of *Syphacia* sp. from the intestine and a fragment of Capillariidae gen. sp. from stomach of *A. argenteus*, however, the precise identification could not be done.

2) Tanega-shima I. Following 5 nematode species were obtained from *A. speciosus*; *H. speciosus*, *S. (M.) suzukii*, *R. cristata*, *M. muris* and *Gongylonema (Gongylonema) neoplasticum* (Gongylonematidae; stomach), and 4 species were obtained from *A. argenteus*; *H. speciosus*, *S. emileromani*, *S. (M.) suzukii*, and *R. cristata*. Occurrence of these nematodes on Yaku-shima and Tanega-shima Is. is shown in Table 1.

3) Kuchinoerabu-jima I. We examined 2 individuals of *A. speciosus* collected on this island, and *H. speciosus* was obtained from both materials.

### Discussion

Several studies have dealt with the nematodes parasitizing the field and wood mice on the main island of Kyushu (Asakawa, 1995; Asakawa *et al.*, 1993; Takao *et al.*, 1990) and its surrounding offshore islands, for example, Nakano-shima I. (Yagi *et al.*, 1983), Shimokoshiki-jima I. (Yagi and Kamiya, 1981), Tsushima Is. and Iki I. (Asakawa *et al.*, 1991). Hence, this is the first report concerning the occurrence and distribution of the parasitic nematodes from Yaku-shima I., Tanega-shima I. and Kuchinoerabu-jima I. because there is no report on the 3 islands.

The nematode species reported from these 3 islands including *Heligmosomoides speciosus* and *Syphacia emileromani* which are endemic to *Apodemus* spp. in Japan (Hasegawa and Asakawa, 1991; Asakawa, 1995), are common with those of mainlands of Japanese Islands (Asakawa, 1995; Asakawa *et al.*, 1992b, 1993).

*Heligmosomoides kurilensis* (Fam. Heligmosomidae) is also common and specific to *A. speciosus*. For example, the occurrence of *H. kurilensis* is 22 from Kyushu (N=40: total number of the mice examined) and is 26 from Iki I. (N=27) (Asakawa *et al.*, 1991, 1993). It is considered that *H. kurilensis* became parasite of *A. speciosus* above 200,000 years ago, namely, prior to the isolation of Sado I. (Ohshima, 1990) because this species was found from this island (Asakawa *et al.*, 1992a). However, *H. kurilensis* could not be obtained from Ohsumi Is. in the present survey. Although we could not know based on the present result whether the nematode species occurs or not on these islands, it is interested that this species was not found on Nakano-shima I., Shimokoshiki-jima I. and Tsushima Is. which surround Kyushu (Yagi *et al.*, 1983; Yagi and Kamiya, 1981; Asakawa *et al.*, 1991). A precise investigation of the geographical distribution of *H. kurilensis* on these islands in order to discuss the

problem of its occurrence should be carried out in future.

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(要約)

鹿児島県大隅諸島産アカネズミ属の  
寄生線虫類の初記録

浅川満彦・富倉忠義  
本川雅治・原田正史

鹿児島県大隅諸島の屋久島、種子島および口永良部島で採集されたネズミ亜科のアカネズミ *Apodemus speciosus* [以下, As]およびヒメネズミ *A. argenteus* [以下, Aa]について, 寄生線虫類の調査を実施した。検査個体数は屋久島産 As 38個体と Aa 36個体, 種子島産 As 27個体と Aa 5個体および口永良部島産 As 2個体であった。寄生虫学的検査をした結果, 屋久島からは次の9種の線虫類が検出された; *Heligmonoides speciosus* [検出された宿主を略号で示す。以下, 同様: As, Aa], *Syphacia emileromani* [Aa], *Syphacia* sp. [幼虫] [Aa], *Heterakis spumosa* [As], *Subulura (Murisubulura) suzukii* [As], *Rictularia cristata* [As, Aa], *Mastophorus muris* [Aa], *Rhabditis (Pelodera) orbitalis* [第3期幼虫] [As] および *Capillariidae* gen. sp. [Aa]。一方, 種子島からは6種が見つかった; *H. speciosus* [As, Aa], *S. emileromani* [Aa], *S. (M.) suzukii* [As, Aa], *R. cristata* [As, Aa], *M. muris* [As, Aa] および *Gongylonema (Gongylonema) neoplasticum*。また, 口永良部島からは *H. speciosus* が検出された。これまでに, いくつかの九州本島と離島産アカネズミ属の寄生線虫類の報告があるが, 大隅諸島における調査はなく, 今回が初報告となった。しかし, 大隅諸島は九州南部から地理的に10万年から13万年の間隔離されたとされるにも関わらず, 今回検出された線虫種は, いずれも日本列島本島で検出されたものと同種であった。

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