

## Helminth Parasites of Rats from Ishigaki Is., Southwestern Japan, with a Note on a Species of *Pterygodermatites* (Nematoda : Rictulariidae)

MASAO KAMIYA\* and TOZO KANDA

Department of Medical Zoology, St. Marianna University School of  
Medicine, Kawasaki, Japan

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There have been very few reports on the helminth parasites of feral rats from Nansei Islands in southwestern Japan (kamiya *et al.*, 1968, and Kamiya and Machida, 1977).

Present specimens were collected from feral rats on Ishigaki Is., one of the southernmost islands situated between lat. 24°N. and 25°N. in Nansei Islands, during the mosquito survey conducted in August 1972 and 1973.

### Materials and Methods

Twenty seven brown rats, *Rattus norvegicus*, and 47 roof rats, *Rattus rattus*, were collected by alive traps in three separated areas in the Island, i.e., Inoda, Tarama Village and the vicinity of Ishigaki City.

All the viscera and tissues were carefully examined macro- and microscopically. The preparation of helminths were made by routine methods. The specimens excepting for nematodes were stained with Semichon's carmine.

The helminths obtained were 9 species : 2 trematodes, 2 cestodes and 5 nematodes as shown in Table 1.

### Results and Discussion

The following 9 species belonging to 9 genera were collected. *Brachylaima ishigakiense* Kamiya et Machida, 1977; *Plagiorchis* sp.; *Raillietina celebensis* (Janicki, 1902); *Ta-*

*enia taeniaeformis* (Batch, 1786); *Strongyloides ratti* Sandground, 1925; *Nippostrongylus brasiliensis* (Travassos, 1914); *Angiostrongylus cantonensis* Chen, 1935; *Pterygodermatites* sp. and *Syphacia muris* (Yamaguti, 1935) Yamaguti, 1941. Some of these species, such as *Plagiorchis* sp. and *Pterygodermatites* sp., could not be identified with known species because of their insufficient informations.

Incidence of helminths are also shown in Table 1. *Brachylaima ishigakiense*, *Plagiorchis* sp. and *Pterygodermatites* sp. were found only in *Rattus rattus*. Among 7 rats infected with *A. cantonensis*, 2 rats had juveniles alone in the brain, one rat both juvenile and adult worms in the brain and pulmonary artery, respectively, and 4 rats adult worms in the pulmonary artery. From these results, it was indicated that the juvenile worms in the brain as well as the adult worms in the pulmonary artery should be examined in order to know actual infections of *A. cantonensis* in feral rats.

The helminth of unusual interest among those found is a species of *Pterygodermatites*. Seven of 47 roof rats harbored this worm in the small intestine, and one male and 22 female worms were collected. The worm curved ventrally at both ends. Two sub-ventral rows of comblike spines existed along almost entire length of body, becoming scarcer and smaller posteriorly. A pair of cephalic papillae with the appearance of sharp spines, located laterally from at the 8th pair of spines as shown in Fig. 1. Well-chitinized buccal capsule was armed with

\* Present address : Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University, Sapporo, Japan

Table 1 Incidence of helminth parasites in two species of rats from Ishigaki Is.

Host	<i>Rattus norvegicus</i>	<i>Rattus rattus</i>
No. examined	27	47
<i>Brachylaima ishigakiense</i>	0*	2
<i>Plagiorchis</i> sp.	0	4
<i>Raillietina celebensis</i>	2	2
<i>Taenia taeniaeformis</i>	2	10
<i>Strongyloides ratti</i>	8	9
<i>Nippostrongylus brasiliensis</i>	10	12
<i>Angiostrongylus cantonensis</i>	7	3
<i>Pterygodermatites</i> sp.	0	7
<i>Syphacia muris</i>	2	3

\* Number of rats positive

three teeth at its base. Morphological characteristics of these female worms as follows. Buccal cavity 0.05–0.08 mm wide, with three teeth. Nerve ring 0.34–0.40 mm from anterior end. Vulva at 3~4 mm from anterior end. Pre vulval combs 41–43 pairs. Post vulval combs 21–19 pairs. Last pair of spines appeared behind anus. Tail 0.19–0.27 mm long. Eggs 0.035–0.045 × 0.027–0.034 mm. These morphological characters were compared with those of published date on related species of *Pterygodermatites* reported by Hoeppli (1929), Chen (1936), Kamiya *et al.* (1968), Kamiya (1975), Lindquist and Li

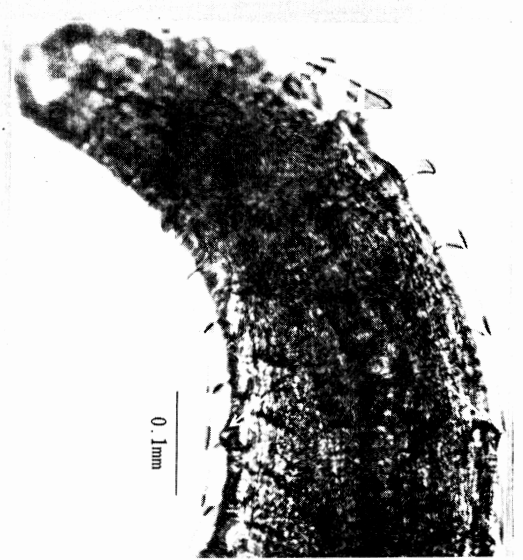


Fig. 1 Anterior end of male *Pterygodermatites* sp. with a pair of cephalic papillae (↘) and two subventral rows of comblike spines.

(1955) and Le Van Hoa (1965). And it was revealed that the present female worms were in close agreement with those descriptions of *P. tani* (= *Rictularia tani*).

Morphological characters of male are shown in Table 2 and compared with related species of *Pterygodermatites*. The present male worm had 10 pairs of caudal papillae. Arrangement of these papillae was shown in

Table 2 Comparison of male *Pterygodermatites*

Species	<i>P. tani</i>	<i>P. tani</i>	<i>P. vauceli</i>	<i>P. sp.</i>	<i>P. sp.</i>	<i>P. sp.</i>
Locality	Canton	Bangkok	Vietnam	Guam	Nagoya	Ishigaki
Authors	Chen(1936)	Kamiya (1968)	Li Van Hoa (1965)	Lindquist & Li (1955)	Kumada (1976)	Present authors
No. examined	1	4	1	2	1	1
Size of worms (mm)	8.73	4.9-5.6		4.9-5.9	4.8	4.8
Size of spicules ( $\mu$ )	equal 86	equal 98	unequal 59&129	unequal 65&150	unequal 85&158	unequal 52&150
Caudal papillae (pairs)	not recorded	not recorded		6 (pre 2, post 4)	7 (pre 2, cloacal 1, post 4)	10 (pre 2, cloacal 1, post 7)
Total combs and spines (pairs)	61-62	62-63	64	62-63	63	62
Fans	1	3		3	4-5	1
Accessory piece	none	present	not recorded	present	not recorded	none

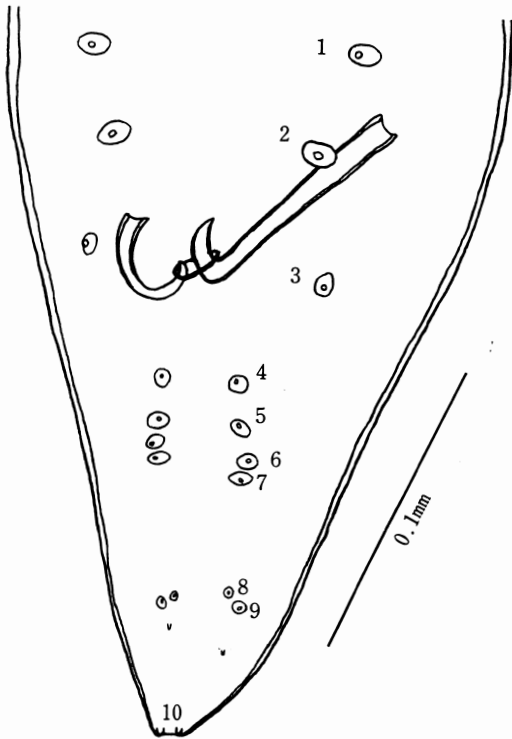


Fig. 2 Arrangement of caudal papillae of male *Pterygodermatites* sp.: 2 precloacal (1 and 2), 1 cloacal (3) and 7 postcloacal (4, 5, 6, 7, 8, 9 and 10).

Fig. 2; 2 precloacal (Fig. 1: 1, 2), 1 cloacal (Fig. 1: 3) and 7 postcloacal (Fig. 1: 4-10). Distances of each pair of papillae from posterior end in numbering order were 250, 210, 170, 133, 118, 100, 90, 55, 50 and  $0\ \mu$ , respectively. Fifth, 6th and 7th papillae appeared transitionally close each other and 8th and 9th papillae appeared also close each other. Double papillae were observed unilaterally on the left side at  $400\ \mu$  from posterior end as shown in Fig. 3.

Recently, the present authors had a chance to examine a specimen of male *Pterygodermatites* from *R. rattus* on Ishigaki Is. collected by Dr. H. Kamiya (Kamiya and Machida, 1977). In this worm, body 5.85 mm long, and 0.364 mm wide at the middle of the body. Spicules unequal; left spicule  $145\ \mu$  and right spicule  $62\ \mu$  long.

Of four fans, three were large and

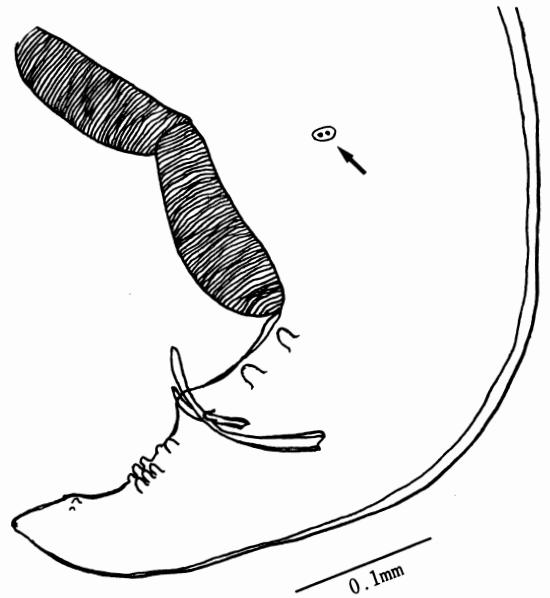


Fig. 4 Lateral view of posterior end of *Pterygodermatites* sp. with unilateral double papillae (✓).

one small. Number of combs 64 pairs. Arrangement and number of caudal papillae was the same as that of the present male worm. Distances of each pair of papillae from posterior end in numbering order were 303, 253, 198, 148, 125, 113, 100, 38, 31 and  $0\ \mu$ , respectively. Additional double papillae were also observed in this specimen unilaterally on the left side at  $466\ \mu$  from posterior end. According to these morphological characters, male worms collected by the authors and Dr. H. Kamiya are believed to be the same species. Such arrangements of caudal papillae, unilateral double papillae in male and cephalic papillae seemed to be specific to this species and have never been reported hitherto. There were remarkable difference between *P. tani* and the present species in the length of spicule; equal in *P. tani* and unequal ( $52$  and  $150\ \mu$ ) in the present species. On the number of cuticular combs and the length of unequal spicules excepting the number of male caudal papillae, the measurements of the present specimens were resembling to the *Pterygodermatites* spp. reported by Lindquist and Li (1955) from

Guam, Kumada (1975) from Nagoya harbour in Japan and to *P. vauceli* reported from *Sciurus pygerythrus* in Vietnam by Le Van Hoa (1965). Differences in number of caudal papillae assumed due to the methods for observations, i.e., lateral and dorso-ventral views. However, with the available information at present the authors could not identify the present species with *P. vauceli*. In order to identify the present species with *P. vauceli* or establish a new species, more informations on *P. vauceli* are required, especially on the arrangement of caudal papillae and the presence of double papillae indicated above.

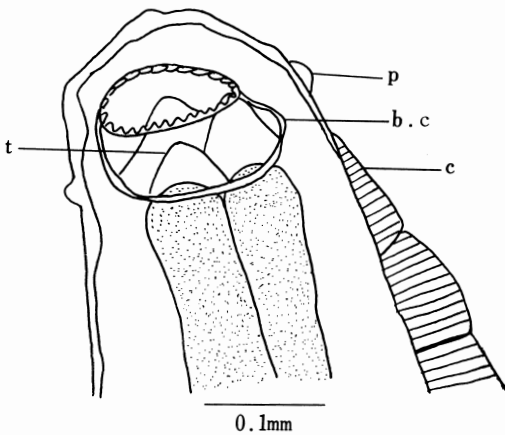


Fig. 4 Dorsal view of anterior end of male *Pterygodermatites* sp. with three teeth (t), lateral papillae (p), buccal capsule (b. c) and combs (c).

Quantin (1969) stressed the buccal structure, the arrangement of caudal papillae and the cuticular elements of Rictulariidae as significant taxonomical factors and restored the genus *Pterygodermatites* Wedl, 1861, which had been synonymized with *Rictularia*. According to his opinion, *Rictularia* has laterally elongated buccal opening with a single tooth at base whereas *Pterygodermatites* has buccal opening somewhat shifted dorsally at apical and with three teeth at base as the present specimens does as shown in Fig. 4. Therefore, in this report, the authors accepted his opinion and reported the present specimens as *Pterygodermatites*.

## Summary

From the feral rats, *Rattus rattus* and *Rattus norvegicus*, on the Ishigaki Is., one of the southmost islands in Japan, the following helminth parasites were collected: Trematoda-*Brachylaima ishigakiense*, *Plagiorchis* sp., Cestoda-*Raillietina celebensis*, *Taenia taeniaeformis*, Nematoda-*Syphacia muris*, *Strongyloides ratti*, *Nippostrongylus brasiliensis*, *Angiostrongylus cantonensis* and *Pterygodermatites* sp.

Pertaining to *Pterygodermatites* sp., characteristic structures on the arrangement of caudal papillae, presence of unilateral double papillae and cephalic papillae were recorded. Because of limited informations of known species, however, the present authors could not establish a new species.

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石垣島のクマネズミおよびドブネズミの寄生蠕虫類，とくに  
*Pterygodermatites* 属線虫 (*Ritulariidae*) について

神谷正男 神田錬蔵

(聖マリアンナ医科大学病害動物学教室)

石垣島のクマネズミとドブネズミより下記の9属9種の寄生蠕虫類を検出した；吸虫2種 *Brachylaima ishigakiense*, *Plagiorchis* sp., 条虫2種 *Raillietina celebensis*, *Taenia taeniaeformis*, 線虫5種 *Syphacia muris*, *Strongyloides ratti*, *Nippostrongylus brasiliensis*, *Angiostrongylus cantonensis*, *Pterygo-*

*dermatites* sp..

これらのなかで，*Pterygodermatites* sp., において特徴的な10対の尾乳頭の配列（肛前乳頭2対，肛門部乳頭1対，肛後乳頭7対），偏側性の2重乳頭1個および頭部乳頭1対を記録した。