

Research Note

## A Survey of *Angiostrongylus cantonensis* in the Port Side Areas of Kagoshima City and Makurazaki City, Kagoshima Prefecture

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(Received for publication; September 30, 1986)

**Key words:** *Angiostrongylus cantonensis*, *Rattus norvegicus*, *Limax marginatus*, Kagoshima, Makurazaki

In Japan, *Angiostrongylus cantonensis*, the rat lungworm, was first discovered from rats in Iriomote Island, the Nansei Islands (Nishimura *et al.*, 1964). Thereafter, *A. cantonensis* has been detected among rodents and mollusks in southern islands and several areas of Japan proper (Otsuru, 1977), and a total of 20 cases of eosinophilic meningitis or meningoencephalitis suspected of angiostrongyliasis have been found (Sato and Otsuru, 1983). One case out of 20 cases of eosinophilic meningoencephalitis suspected of angiostrongyliasis was reported from Kagoshima City (Kuriyama *et al.*, 1978). And, Ishida *et al.* (1977) found out *A. cantonensis* larvae from *Fruticicola despecta sieboldiana* in Makurazaki City. The authors carried out the survey of *A. cantonensis* among rodents and mollusks in Kagoshima City and Makurazaki City, Kagoshima Prefecture in 1985 and 1986. The present paper reports the discovery of *A. cantonensis* in Kagoshima City.

The survey of *A. cantonensis* was performed in Kagoshima New Port (Jonan-cho) and Port for Lumber (Tokai-cho) of Kagoshima City, and Makurazaki City (Fig. 1). Kagoshima New Port is surrounded by storehouses, dwelling houses and vacant lands. The ships from the Nansei Islands arrive in this port. Port for Lumber is mainly used for import of lumbers

from countries of Southeast Asia. The port side area is occupied by lumberyards and sawmills. Makurazaki City has a port for the ships of pelagic fishery.

Rodents were trapped with snap-traps. Captured rodents were identified and their length and weight were measured. The lungs, heart and brain were removed, placed in saline and examined for *A. cantonensis*. Mollusks were collected from same areas where rats were trapped. Collected mollusks were minced

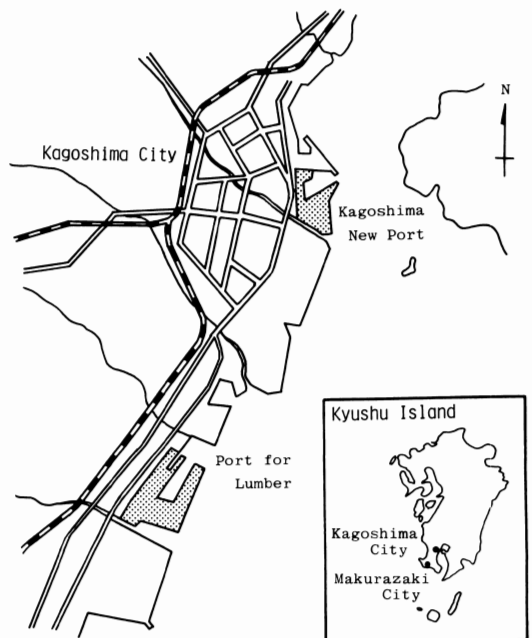


Fig. 1 Map of Kagoshima City and Makurazaki City. Survey was made in two areas of Kagoshima City (Kagoshima New Port and Port for Lumber) and Makurazaki City.

The publication of this paper was supported by Kodama Memorial Fund for Medical Science Research, Department of Medical Zoology, Faculty of Medicine, Kagoshima University, Usuki, Kagoshima 890, Japan.  
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into small pieces with scissors, and digested with 1% HCl-pepsin solution for 3 hours at room temperature (25–30°C). After digestion, the mixture was strained through a gauze, and was examined for third-stage larvae of *A. cantonensis*. Some larvae were fed to laboratory-bred white rats (Wister) by a stomach tube.

The results of survey of *A. cantonensis* among rodents and mollusks are shown in Tables 1 and 2. The worms obtained from captured rodents and experimentally infected white rats were identified as *A. cantonensis* by morphological characters. In Kagoshima New Port, five out of 26 *Rattus norvegicus* (19.2%) were parasitized with *A. cantonensis*. The mean number of worms per rat was 11.4. *Limax marginatus* was found to be infected with third-stage larvae of *A. cantonensis*. These third-stage larvae grew up into adult worms

in white rats. In Port for Lumber, three out of 13 *R. norvegicus* (23.1%) were parasitized with *A. cantonensis*. The mean number of worms per rat was 15.7. Four species of mollusks (Table 2) were collected, and only *L. marginatus* was found to be infected with third-stage larvae of *A. cantonensis*. These third-stage larvae grew up into adult worms in white rats. In Makurazaki Port and surrounding area, four species of rodents and three species of mollusks (Tables 1 and 2) were collected, but no infections with *A. cantonensis* were found out.

The infection of rats and mollusks with *A. cantonensis* has been known in tropical and subtropical areas such as the Pacific Islands and Southeast Asia. In Japan, *A. cantonensis* has been found not only in southern islands (the Nansei Islands and the Ogasawara Islands) which are in subtropical area but also in other northern areas which are in temperate area

Table 1 Prevalence of *A. cantonensis* among rodents

Locality	Species	No. examined	No. positive	Positive rate (%)
Kagoshima New Port	<i>Rattus norvegicus</i>	26	5	19.2
Port for Lumber	<i>Rattus norvegicus</i>	13	3	23.1
	<i>Mus musculus</i>	4	0	0.0
Makurazaki	<i>Rattus norvegicus</i>	25	0	0.0
	<i>Rattus rattus</i>	1	0	0.0
	<i>Mus musculus</i>	3	0	0.0
	<i>Apodemus speciosus</i>	4	0	0.0

Table 2 Prevalence of *A. cantonensis* among mollusks

Locality	Species	No. examined	Results
Kagoshima New Port	<i>Limax marginatus</i>	279	Positive*
Port for Lumber	<i>Limax marginatus</i>	166	Positive**
	<i>Deroceras varianus</i>	9	Negative
	<i>Pupinella rufa</i>	64	Negative
	<i>Fruticicola despecta sieboldiana</i>	1	Negative
Makurazaki	<i>Limax marginatus</i>	38	Negative
	<i>Bradybaena similaris</i>	12	Negative
	<i>Fruticicola despecta sieboldiana</i>	11	Negative

\*Positive for third-stage larvae in two groups out of 14 groups.

\*\*Positive for third-stage larvae in three groups out of 14 groups.

(Otsuru, 1977). Kagoshima Prefecture is situated at the southernmost tip of Kyushu Island, and bustles with activity as a gateway to southern area where murine and human angiostrongyliasis occurs. Therefore, the invasion of *A. cantonensis* has been expected in Kagoshima Prefecture. Hoshino *et al.* (1977) examined 103 *R. norvegicus* trapped in port side areas of Kagoshima City, but *A. cantonensis* was not found out. Ishida *et al.* (1977) carried out survey of *A. cantonensis* larva among mollusks in Kagoshima Prefecture. The third-stage larvae of *A. cantonensis* were found out from *F. despecta sieboldiana* collected in Makurazaki City and Ijuin Town, but were not found out in five areas of Kagoshima City. In the present survey, *A. cantonensis* found out from *R. norvegicus* and *L. marginatus* in port side areas of Kagoshima City. In these areas, *R. norvegicus* is dominant species in rodent fauna, and *L. marginatus* is found in large number. Therefore, *R. norvegicus* and *L. marginatus* are suspected of playing the important role in prevalence of *A. cantonensis* in the port side areas of Kagoshima City. Makiya and Onitake (1983) reported that *R. norvegicus* infected with *A. cantonensis* were captured in a residential area more than ten kilometers away from port area of Nagoya City. In Kagoshima City, the port side area adjoins residential area, and one case of eosinophilic meningoencephalitis suspected of angiostrongyliasis was already reported (Kuriyama *et al.*, 1978). Accordingly, there is quite a possibility that *A. cantonensis* is prevalent in a residential area of Kagoshima City. An extensive survey of *A. cantonensis* in a residential area should be carried out, because *A. cantonensis* is one of the important zoonoses.

Ishida *et al.* (1977) found out *A. cantonensis* larvae from *F. despecta sieboldiana* collected in Makurazaki City, and the larvae grew up into

adult worms in experimentally infected white rats. In the present survey, four species of rodents and three species of mollusks were collected, but no infections with *A. cantonensis* were found out in these animals. Therefore, prevalence of *A. cantonensis* in rodents and mollusks in the area seems to be low.

#### Acknowledgements

The authors wish to thank Health Department of Kagoshima Prefectural Government for their cooperation. Thanks are also due to Mr. M. Chinen, Mawashi Senior High School, Okinawa, for his help in identification of the mollusks.

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