

Research Note

Epidemiological Survey on *Angiostrongylus cantonensis* in Fiji

MOTOHITO SANO<sup>1)</sup>, AKIRA I. ISHII, D. J. CLARKSON<sup>2)</sup> AND J. U. MATAIKA<sup>3)</sup>

(Received for publication; August 17, 1987)

**Key words:** *Angiostrongylus cantonensis*, Fiji, Epidemiological survey.

There have been reports from all parts of the world on human infection by animal parasites. Among these parasites, *Angiostrongylus cantonensis*, the rat lungworm, is well known as a causative agent of human eosinophilic meningoencephalitis. The geographical distribution of this species is widely spreading, mainly in the tropical and subtropical areas. Recently in Fiji, *A. cantonensis* was firstly recorded in molluscus and wild rats at four areas near the sea on Viti Levu by Uchikawa *et al.* (1984). Since the data available on the incidence and distributional pattern of the parasite are still insufficient, it appeared pertinent to investigate the new distribution of this parasite there. The authors had an opportunity of examining rats which were captured at the different areas, a farm and a fishing port, from those reported by them in Fiji. Among these rats were found metastrongyloid worms which were parasitic in the pulmonary artery of the animals. This report is of special medical importance as it would help drawing the attention of public health authorities to this parasite.

In November, 1983, for exploring the rat lungworm, *A. cantonensis*, on Viti Levu, Fiji Islands, wild rats were trapped at an area (a farm) near the Laucala bay and Rewa basin (a

fishing port) (Fig. 1). The lungs and heart of each rat were dissected and carefully examined for adult worms. Some metastrongyloid worms were obtained from the pulmonary artery of 10 out of 43 rats. As shown in Table 1, at a farm area, out of 25 rats, 1 *Rattus rattus* and 3 wild rats which could not be identified with the species because of the heavy damages by trapping were found positive, the infection rate being 16.0% with a worm burden ranging from 6 to 13 per rat. At a fishing port, out of 18 rats, 1 *R. rattus* and 5 *R. exulans* were positive, infection rate being 33.3% and worm burden ranging from 5 to 33 per rat.

To study the morphology of parasites obtained from rats, they were fixed in 10% formalin solution and examined microscopically. Measurements were taken by means of a calibrated ocular micrometer at Department of Parasitology in Hamamatsu University School of Medicine. Nematode parasites obtained in this study is almost morphologically identical with *A. cantonensis* (Chen, 1935)

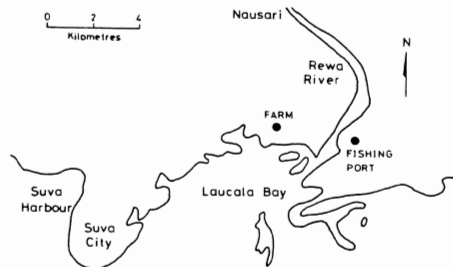


Fig. 1 Rough map of Suva city and environs on Viti Levu, Fiji, showing the areas (●) of wild rats captured and examined.

<sup>1)</sup>Department of Parasitology, Hamamatsu University School of Medicine, Hamamatsu, Japan.

<sup>2)</sup>Laboratory of Pathology, Ministry of Agriculture, Nausori, FIJI.

<sup>3)</sup>Wellcome Virus Laboratory, Tamavua Hospital, Suva, FIJI.

佐野基人 石井 明 (浜松医科大学寄生虫学教室)

Table 1 Rat species and sex ratio of *Angiostrongylus cantonensis* found in each rat.

Locality	No. of rat examined	No. of rat positive	Rat species positive	No. of worms found		
				Male	Female	Total
Farm	25	4	<i>Rattus rattus</i>	6	3	9
			Not identified	3	3	6
			"	8	4	12
			"	8	5	13
Fishing port	18	6	<i>Rattus rattus</i>	21	12	33
			<i>Rattus exulans</i>	3	2	5
			"	5	3	8
			"	5	3	8
			"	5	4	9
			"	6	4	10
Total	43	10		70	43	113

Dougherty, 1946. This identification was based on comparing the morphological characters of the parasite with those given for *A. cantonensis* previously described in other areas of the world (Weinstein *et al.*, 1963; Alicata, 1968, 1969; Alicata and Jindrak, 1970; Bhaibulaya, 1975). Morphological features of the worms are shown in Table 2. The male worms (5 specimens) measure 19.19 mm in average length, and 0.34 mm in average maximum width. The oesophagus is club-shaped and measures 0.29 mm in average length. The caudal bursa is well developed and shows the characteristics of the species (Bhaibulaya, 1979). The spicules are 1.10 mm in average length. The gubernaculum is present. The female worms (6 specimens) measures 31.82 mm and 0.52 mm in average length and maximum width, respectively. The oesophagus is 0.35 mm in average length. The posterior end is conical in shape and the vulva lies close to the anus. The vulva and the anus, respectively, lies at 0.24 mm and 0.06 mm in average length from the tip of the

tail. The minute projection at tip of the tail is absent (Bhaibulaya, 1979).

In addition to the distribution of *A. cantonensis* at four areas near the sea reported by Uchikawa *et al.* (1984), the present study showed the new distribution of this parasite at a farm region as well as at a fishing port. Human infection can be acquired upon eating raw or undercooked food containing the third-stage larvae of the parasite, or by drinking or coming in contact with contaminated water (Alicata and Jindrak, 1970). As Uchikawa *et al.* (1984) have also reported the presence of the third-stage larvae of this parasite from native slugs, the discovery of the parasite at a farm and fishing port may be considered an important public health problem. Up to date, there is no report of human cases in Fiji, however, as the possibility of human infection with *A. cantonensis* cannot be excluded there, the attention of public health to this parasite should be given.

Table 2 Average measurements of *Angiostrongylus cantonensis* fixed with 10% formalin. (Mean  $\pm$  S.D., mm in length)

Sex	No. examined	Body length	Body width	Oesophagus	Spicules	Vulva	Anus
Male	5	19.19 $\pm$ 2.15	0.34 $\pm$ 0.04	0.29 $\pm$ 0.03	1.10 $\pm$ 0.04	—	—
Female	6	31.82 $\pm$ 2.40	0.52 $\pm$ 0.05	0.35 $\pm$ 0.03	—	0.24 $\pm$ 0.03	0.06 $\pm$ 0.01

## References

- 1) Alicata, J. E. (1968): The gubernaculum of *Angiostrongylus cantonensis* (Chen). *J. Parasitol.*, 54, 1193.
- 2) Alicata, J. E. (1969): On the identity of *Angiostrongylus* from rats in Brisbane, Australia, and on the life history of *A. cantonensis*. *J. Parasitol.*, 55, 323.
- 3) Alicata, J. E. and Jindrak, K. (1970): Life cycle and biology. In *Angiostrongylosis in the Pacific and Southeast Asia* (Ed. H. H. Anderson), pp. 17–27. Charles C. Thomas, Springfield, Illinois.
- 4) Bhaibulaya, M. (1975): Comparative studies on the life history of *Angiostrongylus mackerrasae* Bhaibulaya, 1968 and *A. cantonensis* (Chen, 1935). *Int. J. Parasitol.*, 5, 7–20.
- 5) Bhaibulaya, M. (1979): Morphology and taxonomy of major *Angiostrongylus* species of Eastern Asia and Australia. In *Studies on Angiostrongylosis in Eastern Asia and Australia* (Ed. J. H. Cross), pp. 4–13. NAMRU-2-SP-44, Taipei, Taiwan.
- 6) Uchikawa, R., Takagi, M., Matayoshi, S. and Sato, A. (1984): The presence of *Angiostrongylus cantonensis* in Viti Levu, Fiji. *J. Helminthol.*, 58, 231–234.
- 7) Weinstein, P. P., Rosen, L., Laqueur, G. L. and Saeyer, T. K. (1963): *Angiostrongylus cantonensis* infection in rats and rhesus monkeys, and observations on the survival of the parasite *in vitro*. *Am. J. Trop. Med. Hyg.*, 12, 358–377.