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ANGIOSTRONGYLUS SANDARSAE ALICATA, 1968 (NEMATODA : METASTRONGYLOIDEA) FROM *PRAOMYS NATALENSIS* IN KENYA[1)]

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In July 1979, *Angiostrongylus sandarsae* ALICATA, 1968 was detected in the pulmonary artery of *Praomys natalensis* collected in Kitale, western Kenya. This is the first record of the genus *Angiostrongylus* (subgenus *Parastrongylus*) in Kenya.

Key words : *Angiostrongylus sandarsae*, Kenya, *Praomys natalensis*

Public health importance of angiostrongylid nematodes has been recently reviewed by CROSS (1987). A parasitological survey of rodents on the outskirts of Kitale, Kenya, in 1979, revealed the presence of angiostrongylid nematodes in rats. In the African continent, only three species of the genus *Angiostrongylus*, that is, *A. tateronae*, *A. cantonensis* and *A. sandarsae* have been found in rodents. The specimens from Kenya were compared with 7 species of the genus *Angiostrongylus (Parastrongylus)*, also collected from rodents.

MATERIALS AND METHODS

In July, 1979, rodents were trapped in a forest on the outskirts of Kitale, west of the Republic of Kenya and were examined for helminth parasites. Two male and 2 female angiostrongylid nematodes were recovered from the pulmonary arteries of 3 multimammate rats, *Praomys natalensis*. The worms were collected using a dissection microscope. Only one complete male worm was obtained. The worms were fixed in 10% formalin, cleared in lacto-phenol, and then observed and measured under a light microscope. The specimens were deposited in the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University.

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RESULTS

Angiostrongylus sandarsae ALICATA, 1968

Host : *Praomys natalensis*

Habitat : Pulmonary arteries

Host locality : Kitale, Republic of Kenya (1° North, 35° East)

Date of collection : July, 1979

Descrpition : Major measurements of the worms are shown in Table 1. Filiform nematode with smooth body surface. No lips, no sclerotized wall of buccal cavity (Fig. 1).

Male (based on an intact specimen and the posterior end of an incomplete specimen) : Body length 18.3 mm. Esophagus clave shape, 0.24 mm in length. The distance from anterior end to nerve ring and excretory pore, 163 and 189 μ, respectively. Tail end ventrally curved. Caudal bursa reduced and asymmetric (Figs. 2 & 3). Rays short, with ventral and lateral rays widely divergent. Ventro- and posteroventral rays originating from the same trunk. Ventroventral ray short and branched off at a point proximal 1/3 the length of the posteroventral ray. Tip of posteroventral ray reaches the margin of the lateral lobe but not that of the ventroventral ray. Lateral rays possess common trunk. Antero-lateral ray more stout but shorter than the other 2 lateral rays. Medio- and posterolateral rays have same length and a common trunk which bifurcates distally. Externodorsal rays slender and longer than dorsal ray. Externodorsal ray arising separately from lateral and dorsal rays. Dorsal ray thick at basal portion and bifurcates distally. Cloaca with thick wall. Spicules almost equal in length and comparatively short, 500 and 556 μ, respectively. Each spicule made up of one axis and with 2 finely striated alae extending through the whole length. Sclerotized gubernaculum present.

Female (based on 2 incomplete specimens) : Esophagus length 288 and 301 μ. The distance from anterior end to nerve ring and excretory pore 172 and 181 μ in one worm and 241 and 258 μ in another, respectively (Fig. 1). Distance from posterior end vulva and of anus 40 μ for both and 150 and 190 μ, respectively (Fig. 4). Tail end conical. Size of eggs in uterus 51–61 by 36–39 μ.

DISCUSSION

The genus *Angiostrongylus* has been classified under the superfamily Metastrongyloidea. Taxonomy of this superfamily differed among the various investigators. According to the proposal by ANDERSON (1978), this superfamily can be divided into 7 families. However, according to DRÓŻDŻ (1970), 2 subgenera, namely, *Angiostrongylus (Angiostrongylus)* which contains parasites of carnivores and *Angiostrongylus (Parastrongylus)* which contains parasites of rodents, have been proposed. In the present study, we suggest the use of only the genus *Angiostrongylus*.

To date, the following 7 species are known to be parasites of rodents :

A. tateronae (BAYLIS, 1928)
A. cantonensis (CHEN, 1935)
A. sandarsae ALICATA, 1968
A. mackerrasae BHAIBULAYA, 1968
A. malaysiensis BHAIBULAYA & CROSS, 1971
A. costaricensis MORERA & CESPEDES, 1971
A. siamensis OHBAYASHI, KAMIYA & BHAIBULAYA, 1979

The features of the above 7 species were compared with that of the present specimens in Table 2. Of these species only three, *A. tateronae, A. cantonensis* and *A. sandarsae,* have been reported in the African continent. The present specimen has distinctively shorter spicules than those of *A. cantonensis* or *A. malaysiensis* and resembles the descriptions of *A. sandarsae* and *A. tateronae.* Although both *A. tateronae* and *A. sandarsae* have rudimentary ventroventral rays, those of the former are longer than those of the latter. In addition, *A. tateronae* has thicker ventrolateral ray than the other two lateral rays, and also longer spicules than those of *A. sandarsae.*

The present specimen is similar to *A. sandarsae* in having a gubernaculum and distinctively short ventrolateral ray. Moreover, the bifurcation of the dorsal ray, which was not decribed for *A. tateronae* but stated in the description of *A. sandarsae* also indicates the similarity of the present specimen to the latter.

Nevertheless, the present specimen is also similar to *A. tateronae* in having comparatively longer spicules (over 500 μ) and thicker ventrolateral ray as compared to the other two lateral rays.

Thus, from the above discussion, there is not much differences between *A. tateronae* and *A. sandarsae.* On the basis of the presence of gubernaculum and reports from rodent hosts which were located geographically near to Kenya, the present specimen is thought to be that of *A. sandarsae.*

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TABELE 1 Major measurements of worms*

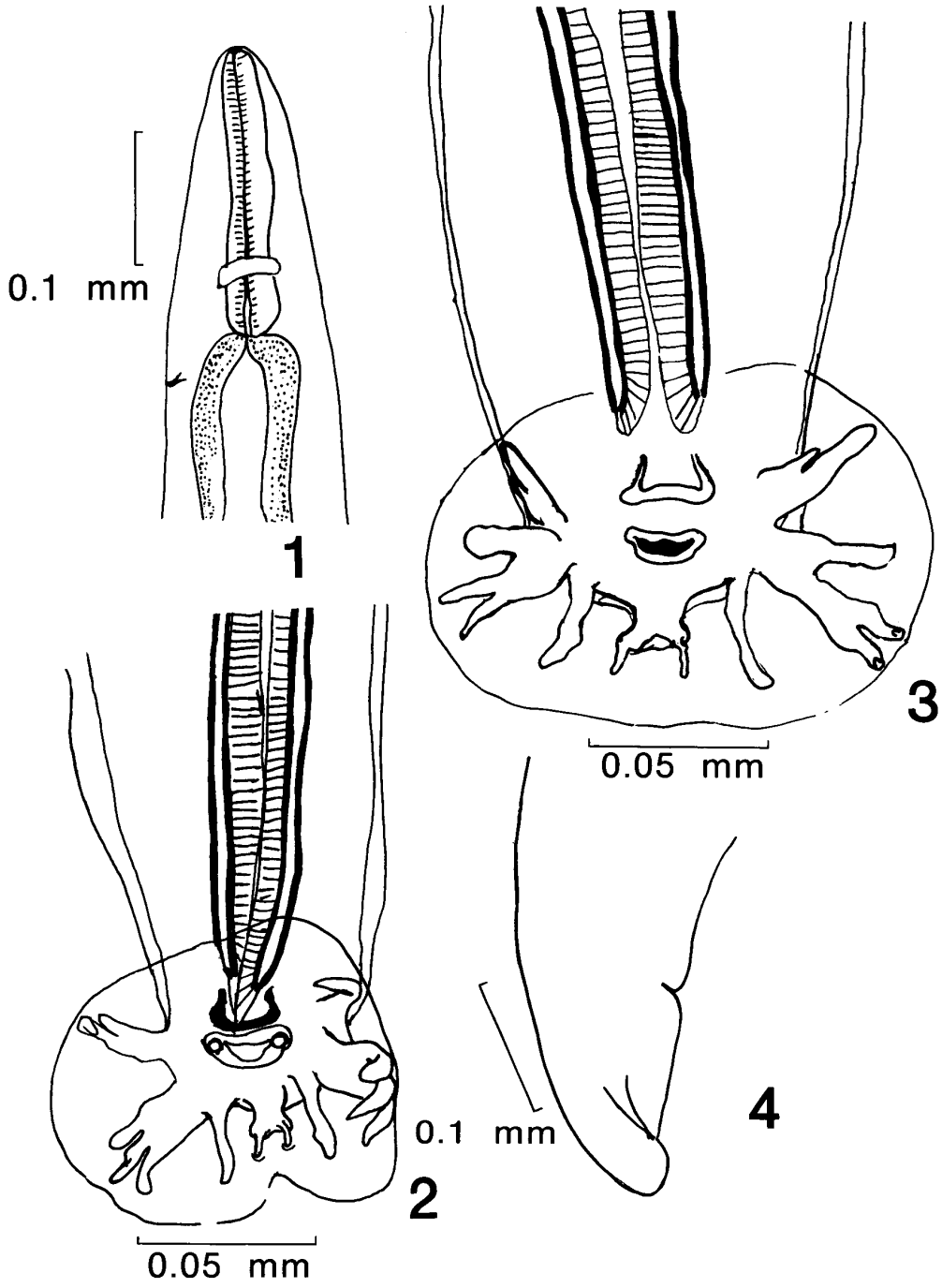
Sex of worm	Male		Female	
Number of worm	No. 1	No. 2	No. 3	No. 4
Body length (mm)	18.3	—	—	—
Esophagus	240	—	288	301
Distance from head end				
Nerve ring	163	—	172	181
Excretory pore	189	—	258	241
Spicules	503	556		
Gubernaculum	+	+		
Distance from tail end				
Anus			40	40
Vulva			150	190
Eggs in uterus			51–61×29–36	

* Measurements in μ unless otherwise indicated and based on one intact male and one incomplete male, and two incomplete females

TABLE 2 Major measurements* and characteristics of the 7 species of the genus *Angiostrongylus (Parastrongylus)* collected from rodents

Species	*cantonensis*	*malaysiensis*	*costaricensis*	*siamensis*	*mackerrasae*	*tateronae*	*sandarsae*	*sandarsae*
Host	*Rattus* spp. *R. norvegicus*	*R. jalorensis*	*R. norvegicus* *Sigmodon hispidis* *Homo sapiens*	*R. sabanus* *Macaca* sp.	*R. fuscipes*	*Taterona Kempi* (=*Tatera* sp.?)	*Mastomys natalensis* *Gerbil tetra* (=*Tatera* sp.?)	*Praomys natalensis*
Habitat Locality	Pulm. A. Cosmopolitan (Asia)	Pulm. A. Malaysia Australia	Mes. A. Costa Rica (Caribian sea)	Mes. A. Thailand	Pulm. A. Australia	Pulm. A. Nigeria	Pulm. A. Mozambique	Pulm. A. Kenya
Authors	BHAIBULAYA (1968)	BHAIBULAYA & CROSS (1971)	MORERA & CESPEDES (1971)	OHBAYASHI et al. (1979)	BHAIBULAYA (1968)	BAYLIS (1928)	ALICATA (1968)	Present authors (1988)
Male								
Body length	12.07-27.69	16-20	15-17.9	10	12.78-21.3	14-14.7	18-22	18.3
Esophagus	0.22-0.33	0.11-0.28	0.16-0.18	0.23	0.21-0.38	0.25	0.233-0.241	0.24
Cervical papillae	+	-	-	-	+	?	?	ND
Excretory pore	0.28-0.53		0.17	0.32	0.3-0.41	ND	ND	0.189
Spicule	1.0-1.46	0.80-1.20	0.267-0.297	0.339	0.4-0.6	0.5-0.62	0.33-0.35	0.503 : 0.556
Gubernaculum	+	+	+	+	-	+ (?)	+	+
Female								
Body length	14.9-34.1	23-27	26.9	11-13	21.3-30.5	14.5-21	21-36	-
Esophagus	0.22-0.42	0.25-0.30	0.168	0.23-0.27	0.24-0.41	0.28	0.235-0.264	0.288 ; 0.301
Excretory pore	0.34-0.55			0.32-0.36	0.34-0.49	ND	ND	0.241 ; 0.258
Vulva	0.15-0.31	0.1-0.24	0.175	0.3-0.38	0.14-0.25	0.1-0.15	0.20-0.264	0.150 ; 0.190
Anus	0.02-0.08	0.03-0.06	0.053	0.07-0.1	0.03-0.06	0.05-0.06	0.054-0.070	0.040 ; 0.040

Mes. A. : Mesenteric Artery Pulm. A. : Pulmonary artery ND : not examined * in mm



FIGS. 1–4 *Angiostrongylus sandarsae*
Fig. 1 Anterior end of female
Fig. 2 Bursa (#1), ventral view
Fig. 3 Bursa (#2), ventral view
Fig. 4 Posterior end of female