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A NEW LUNGWORM, *PROTOSTRONGYLUS* (*DAVTIANOSTRONGYLUS*) *SHIOZAWAI* N. SP., FROM THE JAPANESE SEROW, *CAPRICORNIS CRISPUS* (TEMMINCK)

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A new lungworm, *Protostrongylus* (*Davtianostrongylus*) *shiozawai* n. sp., from the Japanese serow was described. Male 24.3~28.4 mm long. Spicules 0.280~0.366 mm, with a rounded distal stem end. Gubernaculum 0.184~0.208 mm; capitulum with accessory processes; proximal half of corpus colorless; each foot of crura with an expansion near distal end and a hook-like process at distal end. Dorsal ray of bursa spherical, with 3 papillae. Telamon with ventro-sagittal plates. Female with well-developed provagina.

The Japanese serow, *Capricornis crispus*, usually inhabits mountain ranges higher than 1,000 m in three islands of Japan: Honshu (Mainland), Shikoku, and Kyushu. This animal is protected by law; therefore, helminthological papers are rarely published. MACHIDA (1970) examined a case from Kanagawa Prefecture and described *Ogmocotyle capricorni* and *Okapinema japonica* as new species. MACHIDA et al. (1974) found *Moniezia monardi* FUHRMANN, 1933, in 2 cases from Iwate and Nagano Prefectures. From Ômachi, Nagano Prefecture, WAN et al. (1974) recognized one case of *Capillaria bovis* (SCHNYDER, 1906) and *Trichuris* sp.

The present materials were obtained from 2 animals who died in February, 1974. One case contained a few immature *Okapinema japonica* and a large number of *Protostrongylus* were discovered in both; the latter is described in this paper. In Japan, two wild ruminants, *Cervus nippon* TEMMINCK and *Capricornis crispus*, can be found, but no reports of *Protostrongylus* have been published.

MATERIALS AND METHODS

The two animals examined had died from an accident in the alpine forests of Komoro and Horikane, Nagano Prefecture, central Honshu. The specimens of lungworms were collected from the alveoles and bronchioles and provided

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by Mr. Michio SHIOZAWA of Matsumoto Animal Health Center, to whom the specific name of the present species was dedicated. The nematodes were thin and long, and it was difficult to collect complete specimens. The male specimens were composed of 3 complete nematodes and many fragmental ones; the latter included 6 posterior and 3 anterior bodies. The female specimens were large in number and all fragmental, but 4 posterior and 3 anterior bodies were included. The specimens were preserved in formalin solution, and were treated by lacto-phenol solution for microscopy. The specimens used in this paper are preserved in the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University.

DESCRIPTION

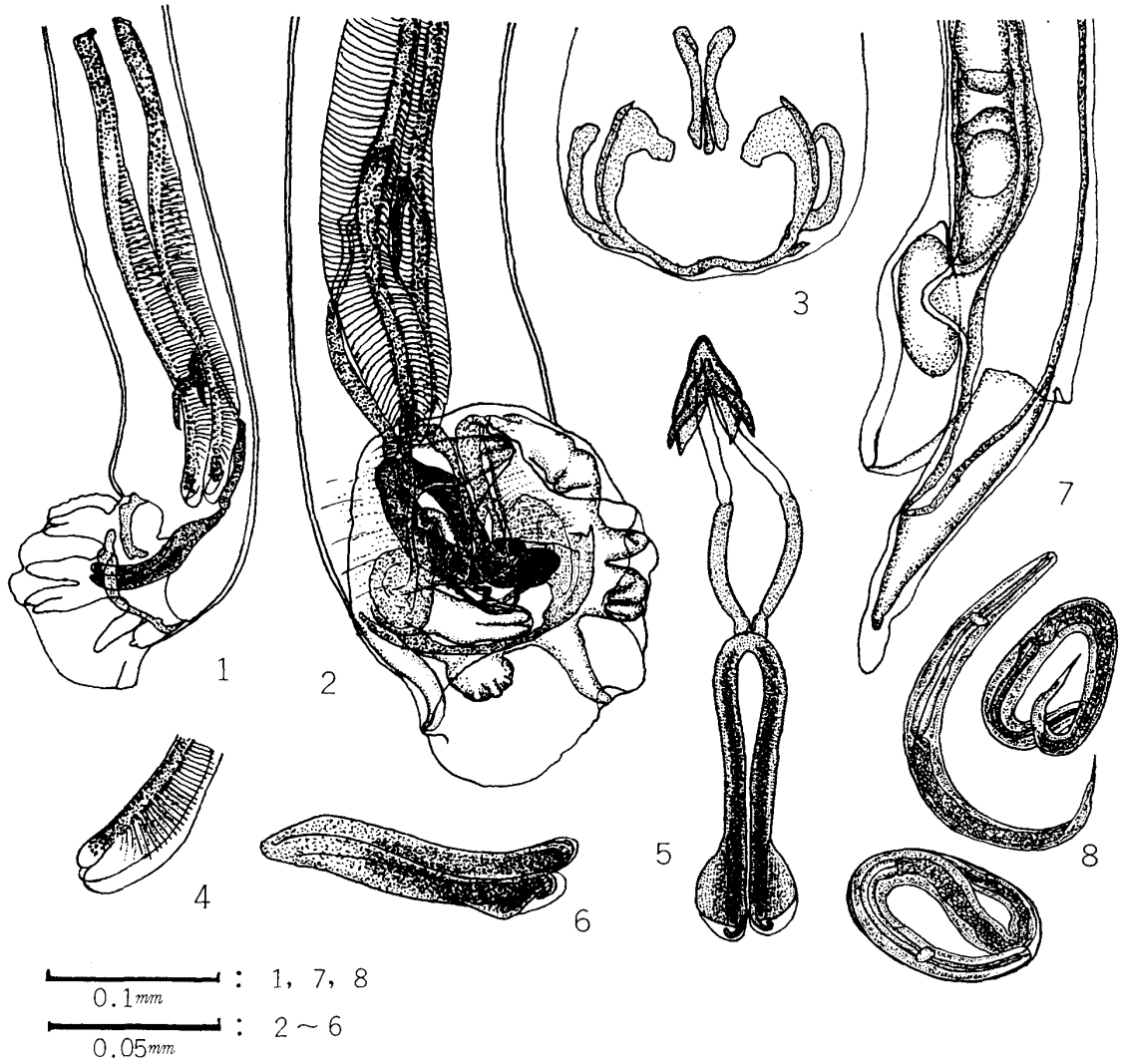
Protostrongylus (*Davtianostrongylus*) *shiozawai* n. sp.

Host *Capricornis crispus* (TEMMINCK)

Habitat Lungs (alveoles and bronchioles)

Description Male: Body length 24.3～28.4 mm, maximal width 0.084～0.104 mm. Esophagus 0.248～0.280 mm long, 0.028～0.036 mm wide. Nerve ring and cervical papillae 0.148～0.158 mm and 0.244～0.285 mm from head end, respectively. Short bursa. Ventral rays fused except at the tips; medio-lateral and postero-lateral rays fused proximally in more than half the length; the tip of the externo-dorsal does not reach the bursal margin. Dorsal ray is spherical with a narrowed root, possessing 3 papillae, the central one rather long and the outer two small. Spicules equal, length 0.280～0.366 mm (av. 0.326 mm); stem spongy and dark yellow in color, distal end rounded and colorless. Two combed alae, up to 0.020 mm in width, begin from proximal one fifth of each spicule stem, rounded end of distal protrusions of alae slightly exceeding stem end. Gubernaculum 0.184～0.208 mm (av. 0.196 mm) in length. Capitulum dark yellow and inverted V-shape, 0.032～0.044 mm long, outer margin well-chitinized, but inner margin and distal end gradually fading. Well-chitinized bispinose accessory process with short peduncle on ventral surface of capitulum; each spine, 0.026～0.032 mm in length, with pointed tip. Corpus established by 2 branches, 0.098～0.116 mm long, proximal half colorless and indistinct; distal half well-chitinized and dark yellow, 0.044～0.066 mm in length, slightly convexed outwards. Crura yellowish brown, 0.084～0.100 mm long, dorso-ventral width up to 0.015 mm, proximal ends fused. Distal half of each foot bends slightly ventral; one ala-like lateral expansion with rounded margin near distal end; distal end thinned laterally and bends latero-anteriad, showing a semicircular hook-like figure from the ventral view. Distal end of foot covered by thin colorless cap. Telamon apparatus well-established and complicated; anterior

FIGURE *Protostrongylus* (*Davtianostrongylus*) *shiozawai n. sp.*



1 Posterior extremity of male, lateral view
2 Posterior extremity of male, latero-ventral
3 Telamon, ventral
4 Distal end of spicule, lateral
5 Gubernaculum, ventral
6 Crura of gubernaculum, lateral
7 Posterior extremity of female, lateral
8 First stage larvae from lung tissue

end of ventral plates widened; a pair of ventro-sagittal plates well-developed.

Female: Longest fragment, posterior body, 19 mm in length; width 0.104~0.125 mm. Esophagus 0.318~0.326 mm long, 0.040~0.048 mm wide. Vulva 0.188~0.236 mm from tail end, subvulvar protuberance prominent, length of vagina 0.560~0.745 mm. Anus 0.064~0.104 mm from tail end. Tail bluntly pointed. Provagina well-developed around body, up to 0.170 mm in length at

ventral portion, often covering anus. Eggs from lung tissue 0.084~0.120×0.056 ~0.068 mm in size.

Larva: First stage larvae collected from pulmonary tissue 0.290~0.375 mm in body length, 0.010~0.014 mm in width. Esophagus 0.124~0.168 mm long. Tail simple and sharply pointed, showing a slight undulation.

DISCUSSION

The genus *Protostrongylus* KAMENSKY, 1905, is composed of three subgenera, *Protostrongylus* KAMENSKY, 1905, *Davtianostrongylus* BOEV, 1950, and *Kochstrongylus* SCHULZ et BOEV, 1951. Judging from the characteristics of the gubernaculum, *P. shiozawai* belongs to the subgenus *Davtianostrongylus*.

Recently, ZDZITOWIECKI & BOEV (1971) described a new species *P.* (*D.*) *caprae*, and redescribed *P.* (*D.*) *davtiani* (SAVINA, 1940) and *P.* (*D.*) *stilesi* DIKMANS, 1931. They made a key of 9 known species of the subgenus *Davtianostrongylus*, including the three species mentioned above together with 6 other species: *P. coburni* DIKMANS, 1933, *P. raillieti* (SCHULZ, ORLOFF et KUTASS, 1933), *P. frosti* HONESS, 1942, *P. etoshai* ORTLEPP, 1962, *P. andreevi* SCHULZ et KADENAZII, 1950, and *P. cameroni* (SCHULZ et BOEV, 1940). Among these species, *P. stilesi* from *Ovis canadensis* is closely related to *P. shiozawai* in the similarities of structures of the gubernaculum: the accessory processes of the capitulum; the lateral expansion; and the distal hook-like process of the crura. However, the gubernaculum of the latter is shorter. The number of papillae on the dorsal ray is 3 in *P. shiozawai*, but 5 in *P. stilesi*. ZDZITOWIECKI & BOEV (1971) described the ventro-sagittal plate of the telamon apparatus in *P. davtiani* and pointed out the absence of this structure in the other 8 species, including *P. stilesi*. *P. shiozawai* possesses this structure, but in *P. davtiani* the distal end of the spicule stem is cup-shaped, the capitulum of the gubernaculum is absent, and the distal portion of the crura has 3 to 6 teeth.

REFERENCES

1) BOEV, S. N., SOKOLOVA, I. B. & PANIN, V. J. (1963): Gel'minty kopytnyh životnyh kazakstana, **2**, Alma-Ata; Izd. Akad. Nauk KazSSR (in Russian)
2) CAMERON, T. W. M. (1927); *J. Helminth.*, **5**, 1
3) DIKMANS, G. (1931): *Proc. U. S. natn. Mus.*, **79**, (18) 1
4) DOUGHERTY, E. C. & GOBLE, F. C. (1946): *J. Parasit.*, **32**, 7
5) MACHIDA, M. (1970): *Bull. natn. Sci. Mus., Tokyo*, **13**, 135
6) MACHIDA, M., MATSUMURA, A. & WATANABE, S. (1974): *Ibid.*, **17**, 157
7) ORTLEPP, R. J. (1962): *Onderstepoort J. vet. Res.*, **29**, 173
8) SKRJABIN, K. I., SHIKHOBALOVA, N. P., SCHULZ, R. S., POPOVA, T. I., BOEV, S. N.

& DELYAMURE, S. I. (1952): Opredelitel' paraziticheskikh nematod, **3**, Moscow: Izdat. Akad. Nauk SSSR (in Russian)

9) WAN, J.-S., AKABANE, M., WATANABE, S. & FUJITA, J. (1974): The 77th Meeting of the Japanese Society of Veterinary Science, Tokyo, No. 237 (in Japanese)

10) ZDZITOWIECKI, K. & BOEV, S. N. (1971) : *Acta parasit. pol.*, **19**, 237