

Cestodes of Field Micromammals (Insectivora) from Central Honshu, Japan

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ABSTRACT—Two new species of hymenolepidid and one new species of dilepidid cestodes were obtained through the examination of 18 shrews belonging to three species of three genera, collected at Toyama and Nagano Prefectures from October 6 to November 15, 1988. *Staphylocystis* (*Staphylocystis*) *toyamaensis* sp. n. from *Crocidura dsinezumi chisai* is related to but differs from *S.(S.)solitaria* in the shape of rostellar hooks. *Ditestolepis longicirrosa* sp. n. from *Sorex shinto shinto* is related to but differs from *D. diaphona* in many morphological characters. *Amoebotaenia urotrichi* sp. n. from *Urotrichus talpoides hondonis* resembles four known species of *Amoebotaenia* in being armed with 10–12 rostellar hooks, but differs from all of them in the length and shape of rostellar hooks. This is the first record of the genus *Amoebotaenia* from wild animals.

INTRODUCTION

The cestode parasites of Insectivora in Japan have been unknown for the most part except two by Sawada and Harada [1], who described *Vampir-olepis notoensis* from *Crocidura dsinezumi chisai* collected at Suzu-shi, Ishikawa Prefecture and *V. amamiensis* from *C. horsfield watasei* at Amami-ôshima, Kagoshima Prefecture.

Hymenolepidid cestodes collected from the dsinezumi-shrew, *C. dsinezumi chisai* Thomas at Asahi-machi and Tateyama-machi, Toyama Prefecture, the shinto-shrew, *Sorex shinto shinto* Thomas at Ina-shi, Nagano Prefecture, and dilepidid cestodes from the Japanese shrew-mole, *Urotrichus tapoides hondonis* Thomas at Ina-shi, Nagano Prefecture, are undescribed species of *Staphylocystis* Villot, 1877, *Ditestolepis* Stolty, 1952 and *Amoebotaenia* Cohn, 1900, respectively.

MATERIALS AND METHODS

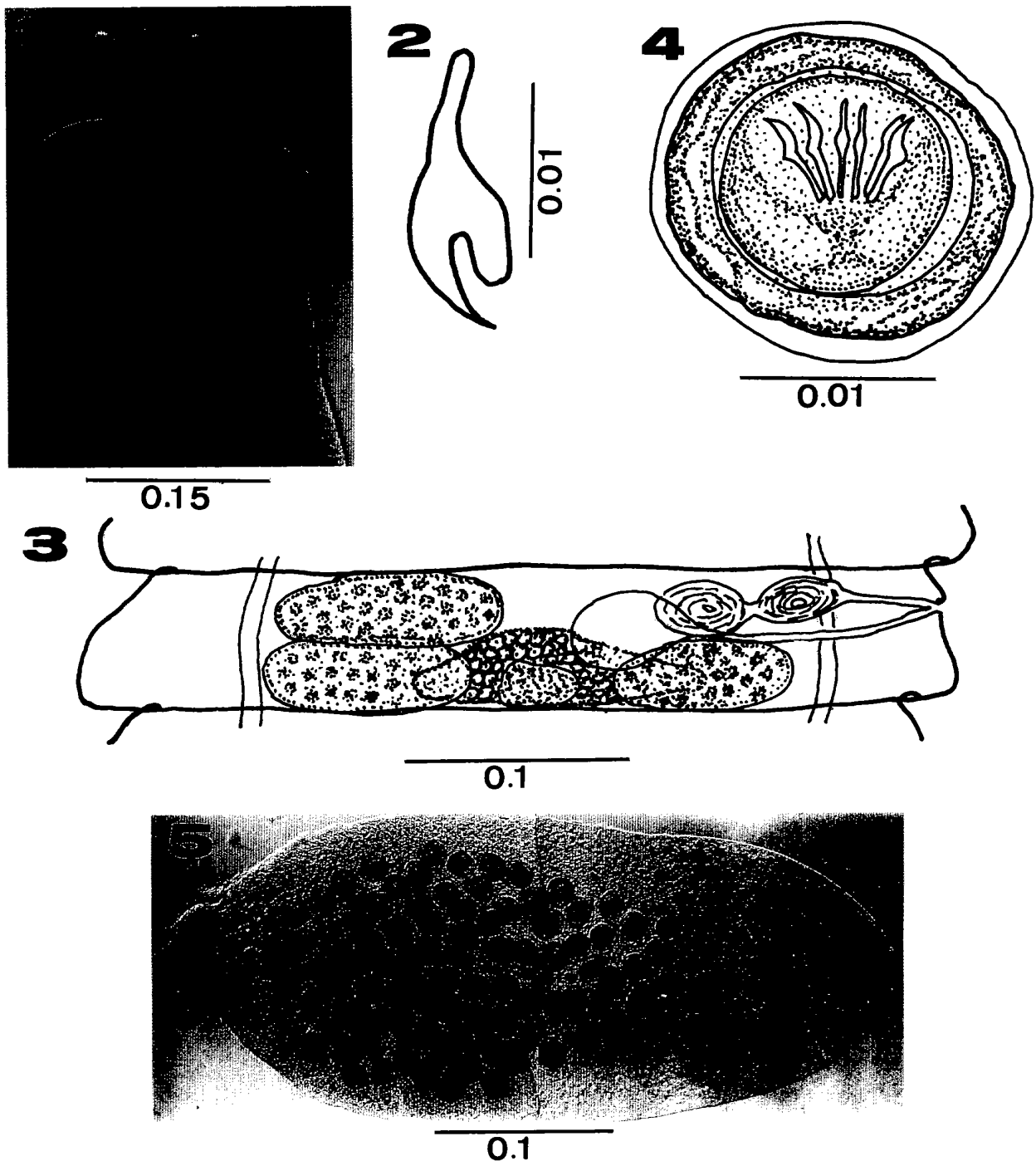
The shrews were autopsied immediately at the collecting sites and their intestinal tracts were fixed

in Carnoy's fluid and bought back to the laboratory. After being soaked in 45% acetic acid for five hr for expanding, they were cut open in 70% ethanol and examined for cestodes. The cestodes obtained were stored in 70% ethanol. The scoleces, eggs and a part of mature segments were unstained and observed under an interference contrast light microscope. The strobilae were stained with ethanol-hydrochloride-carmin, dehydrated in ethanol, cleared in xylene, and mounted in Canada balsam. Measurements are given in millimeters.

Staphylocystis (*Staphylocystis*) *toyamaensis* sp. n.
(Figs. 1–6)

From November 13 to 14, 1988, three specimens of *Crocidura dsinezumi chisai* Thomas were captured by trap at Asahi-machi, Shimoniikawa-gun and Tateyama-machi, Nakashinkawa-gun, Toyama Prefecture. On dissection, they were found infected with 1–48 mature cestodes.

Description: Small-sized hymenolepidid; mature strobila 3–4 in length and 0.4–0.5 in maximum width. Mature segments serrate. Scolex 0.210–0.224 long by 0.245–0.252 wide, not sharply from strobila. Suckers circular, 0.084–0.091 in



FIGS. 1-5. *Staphylocystis (Staphylocystis) toyamaensis* sp. n.

1: Scolex. 2: Rostellar hook. 3: Mature segment. 4: Egg. 5: Detached senile segment. Scale in mm.

diameter. Rostellum 0.042 long by 0.063 wide, armed with a crown of 16 thorn-shaped hooks measuring 0.014 long, blade long, slender and pointed, guard shorter and thick, and handle long. Rostellar sac elongated, 0.140 long by 0.112 wide, extending past posterior margin of sucker. Neck absent.

Genital pores unilateral, located slightly anter-

ior to middle of segment margin. Cirrus sac cylindrical, 0.084-0.140 long by 0.021-0.028 wide, extending beyond longitudinal osmoregulatory canals. Internal seminal vesicle 0.028 long by 0.021-0.035 wide, occupying almost whole of cirrus sac. External seminal vesicle 0.025-0.028 long by 0.021 wide. Testes three in number, ovoid, 0.126 by 0.035, arranged in a form of triangle, one

poral and two aporal. Testes not in contact with longitudinal osmoregulatory canals laterally. Ovary triangular, 0.105–0.140 across, located at posterior margin of two posterior testes. Vitelline gland compact, 0.049–0.056 long by 0.021–0.028 wide. Seminal receptacle well developed, 0.077 by 0.049. Gravid uterus sacculated, not filling whole of segment. Ripe eggs spherical, 0.042–0.053 in diameter; surrounded by four thin envelopes. Onchospheres spherical, 0.028–0.032 in diameter; embryonic hooks 0.014 long.

Host: *Crocidura dsinezumi chisai* Thomas, 1906.

Site of infection: Small intestine.

Locality and date: Ogawa'motoyu, Asahimachi, Shimoniikawa-gun and Senjugahara, Tateyama-machi Nakaniikawa-gun, Toyama Prefecture; November 13–14, 1988.

Type specimen: Holotype: NSU Lab. Coll. No. 9005; Paratypes: No. 9006.

Remarks: Yamaguti [2] divided the genus *Staphylocystis* Villot, 1877, into two subgenera: *S.* (*Staphylocystis*) Villot, 1877 and *S.* (*Staphylocystoides*) Yamaguti, 1959. The present new cestode finds its place in subgenus *Staphylocystis* on the base of a single row of rostellar hooks and disposition of testes. Seven species; *S. scalaris* (Dujardin, 1845) Villot, 1788, *S. tiara* (Dujardin, 1854) Spasskii, 1950, *S. furcata* (Stieda, 1862) Spasskii, 1950, *S. dodecantha* (Baer, 1952) Spasskii, 1950, *S. solitaria* (Meggitt, 1927) Yamaguti, 1959, *S. fuelleborni* (Hilmy, 1936) Spasskii, 1950, *S. loossi* (Hilmy, 1936) Spasskii, 1950, were described from the *Crocidura* (Yamaguti [2], Spasskii [3], Olsen and Kuntz [4], Schmidt [5]). The present new species closely resembles *S. solitaria* [6], of which the description is deficient in some details, in the

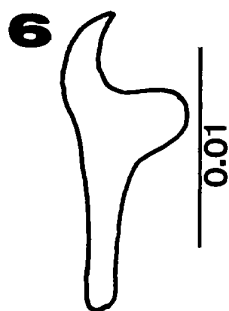


FIG. 6. Rostellar hook of *Staphylocystis* (*S.*) *solitaria*. Scale in mm.

number and length of rostellar hooks. However, it differs from that species in the shape of rostellar hooks (Fig. 6).

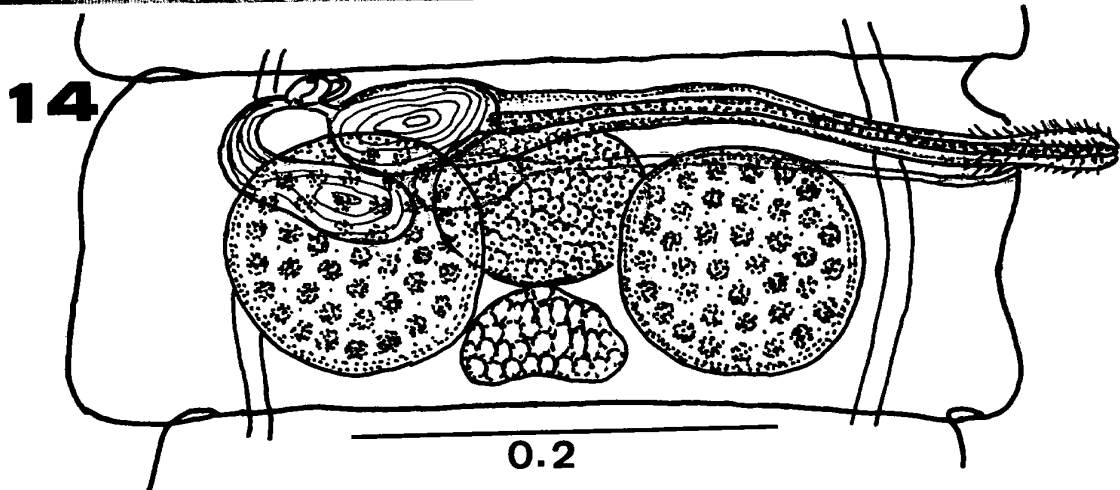
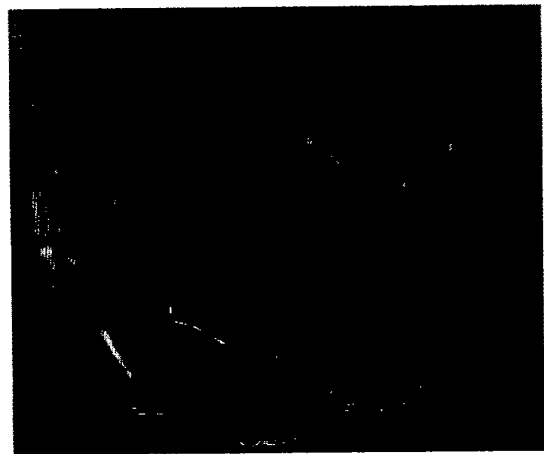
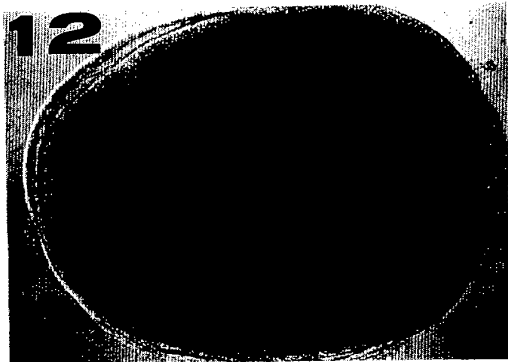
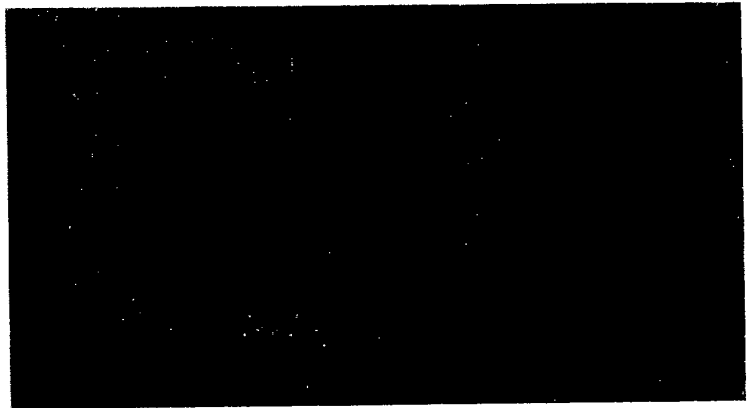
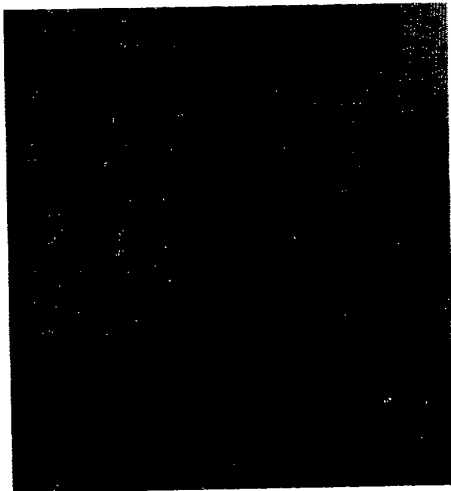
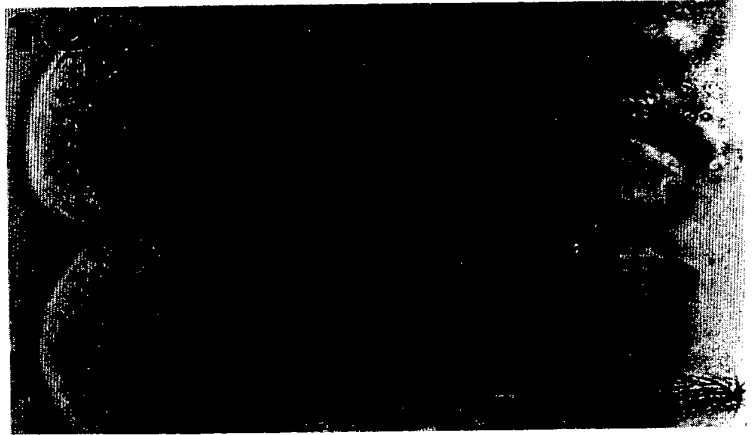
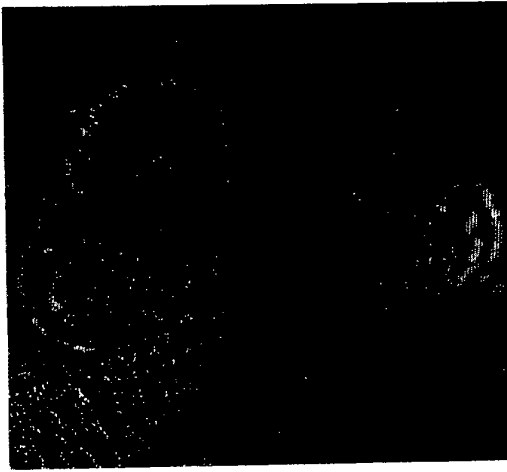
Ditestolepis longicirrosa sp. n.
(Figs. 7–14)

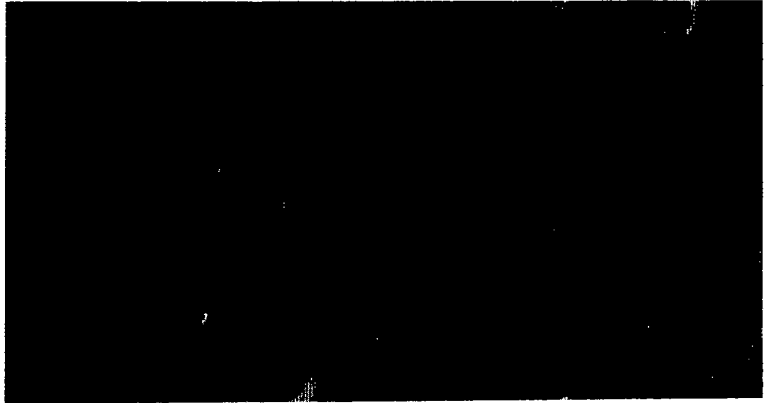
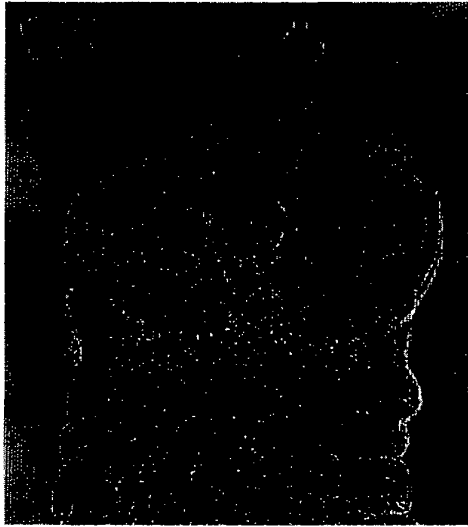
A number of specimens of cestodes representing a species of *Ditestolepis* Stofly, 1952, were found in one shinto-shrew, *Sorex shinto shinto* Thomas captured at October 8, 1988.



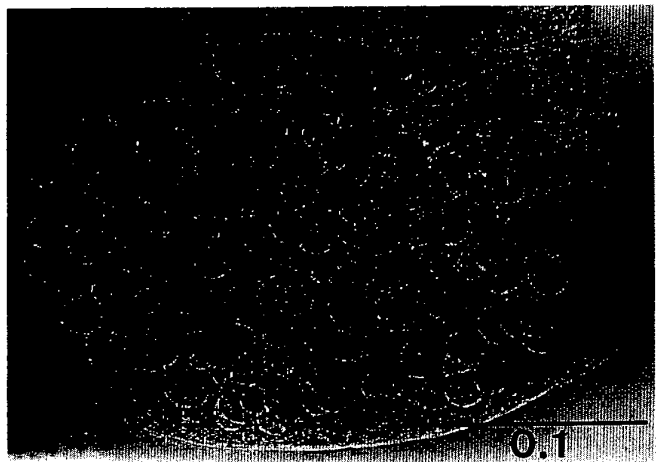
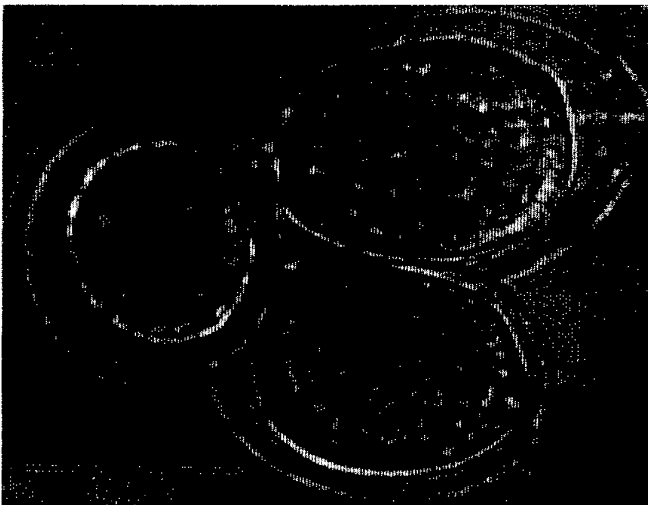
FIG. 7. *Ditestolepis longicirrosa* sp. n. Entire worm, Scale in mm.

Description: Small-sized hymenolepidid; worm length 2.1–2.6; maximum width 0.3–0.4. Metamerism distinct, margins not serrate. Strobila characterized by a distinctly marked subdivision into three series, each of which possessing segments uniformly advanced in development. First series containing 26–34 immature segments; its maximal width 0.19–0.22. Second series containing 9–13 segments with a mature reproductive apparatus; maximal width of this series 0.22–0.28. Third series comprising 16–19 immature uterine segments; maximum width 0.098–0.130. This latter series spilling off from strobila and maturing independently in host's intestine. Detached senile segment oval, 0.67–0.77 long by 0.46–0.53 wide. Scolex 0.245 long by 0.329–0.350 wide, sharply demarcated from short neck. Rostellum rudimentally. Suckers confluent, 0.217–0.231 long by

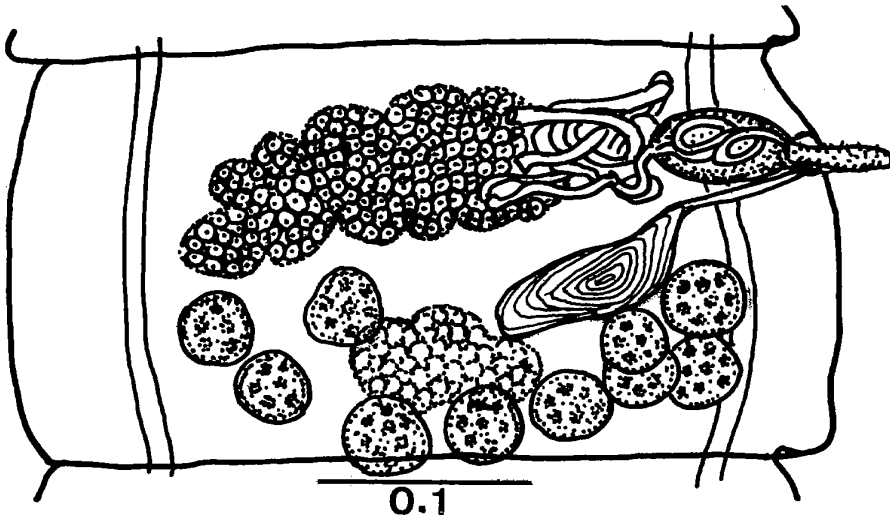




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0.140–0.148 wide. Neck short, 0.11–0.18 long by 0.07 wide. Genital pores unilateral, located at anterior 1/3 of segment margins. Testes two in number, spherical, 0.056–0.070 by 0.046–0.063, one on each side of ovary. Ovary subspherical, 0.060–0.070 long by 0.049–0.056 wide. Vitelline gland compact, 0.053–0.070 by 0.035. Cirrus sac elongate, surpassing center of segment, 0.161–0.175 long by 0.028 wide. Cirrus covered with delicate spines, 0.147–0.154 long. Internal seminal vesicle, located at inner part of cirrus sac, 0.042–0.046 long by 0.028–0.032 wide. External seminal vesicle 0.085–0.095 long by 0.032–0.042 wide. Vagina opening in genital atrium, extending to aporal side, then enlarging forming seminal receptacle measuring 0.032–0.035 long by 0.021–0.028 wide. Eggs spherical, 0.046–0.049 by 0.039–0.046, surrounded by four thin envelopes, with smooth surface. Onchospheres spherical, 0.025–0.032 by 0.028; embryonic hooks 0.011 long.

Host: *Sorex shinto shinto* Thomas, 1905.

Site of infection: Small intestine.

Locality and date: Ogurogawa, Ina-shi, Nagano Prefecture; October 8, 1988.

Type specimen: Holotype: NSU Lab. Coll. No. 9007; Paratypes: No. 9008.

Remarks: At present, only one species, *Diaphona* (Cholodkovsky, 1906) belonging to the genus *Ditestolepis*, of which the descriptions are incomplete, has been recorded from shrews in Estonia and Poland [7–12]. The present new species differs from *D. diaphona* in many morphological characters.

Amoebotaenia urotrichi sp. n.
(Figs. 15–22)

Of 14 specimens of Japanese shrew-mole, *Urotrichus talpoides hondonis* Thomas, collected at Ogurogawa, Ina-shi, Nagano Prefecture from

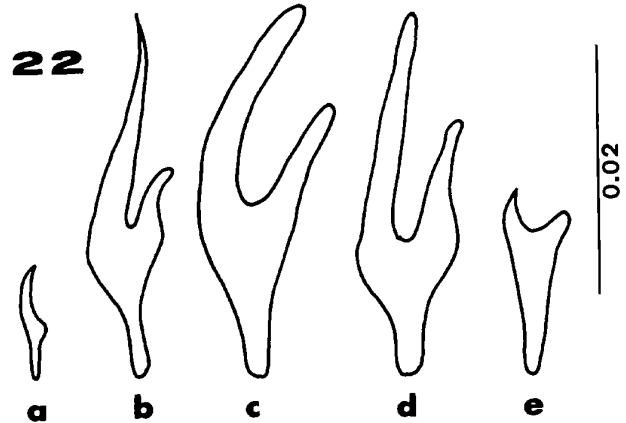


FIG. 22. Comparison of rostellar hooks of five related species. Scale in mm.

a; *A. fuhrmanni*, b; *A. oligorchis*, c; *A. longisacculus*, d; *A. spinosa*, e; *A. urotrichi* sp. n.

October 6 to November 15, three were found infected with a greater number of specimens of the present new cestodes.

Description: Small-sized dilepidid; strobila length 0.8–1.0 and maximum width 0.3–0.4, consisting of 8–9 segments. Metamerism distinct, margins not serrate, segments broader than long. Scolex square, 0.119–0.133 by 0.112–0.126, provided with four suckers and a well-developed protrusible rostellum. Rostellum 0.070–0.079 long by 0.042–0.063 wide, armed with a single row of 10–11 somewhat urench-shaped hooks, each measuring 0.014; guard and blade short, about equal in length, handle solid and longest. Rostellar sac muscular, 0.112–0.126 long by 0.042–0.070 wide. Sucker round, 0.119–0.133 by 0.112–0.126. Neck absent.

Genital pores alternating regularly, located slightly anterior to middle of segment margin. Testes roundish, 9–10 in number, 0.021–0.025 by 0.018–0.021, spreading posterodorsal part of segment between osmoregulatory canals. Cirrus sac oval, 0.070 long by 0.028–0.035 wide. Cirrus opening directly in front of vagina into genital

FIGS. 8–14. *Ditestolepis longicirrosa* sp. n.

8: Scolex 9: Immature segments. 10: Mature segment, dorsal view. 11: Mature segment, ventral view; o: ovary. v: vitelline gland. t: testis. 12: Detached senile segment. 13: Egg. 14: Outline tracing of mature segment, dorsal view. Scale in mm.

FIGS. 15–21. *Amoebotaenia urotrichi* sp. n.

15: Scolex. 16: Rostellar hooks. 17: Mature segment. 18: Cirrus sac and vas deferens. 19: Senile segment. 20: Eggs. 21: Outline tracing of mature segment, dorsal view. Scale in mm.

TABLE 1. Species of *Amoebotaenia* armed with 10–12 mm long rostellar hooks from domestic and wild birds

Cestode species	Rostellar hooks		Host
	Number	Length	
<i>Amoebotaenia fuhrmanni</i> Tseng, 1932 [13]	10	0.007	<i>Gallinago</i> sp.
<i>A. oligorchis</i> Yamaguti, 1935 [14]	10	0.030–0.036	<i>Gallus gallus</i>
<i>A. longisacculus</i> Yamaguti, 1956 [15]	12	0.033	<i>Gallus domesticus</i>
<i>A. spinosa</i> Yamaguti, 1956 [15]	10–12	0.033–0.035	<i>Gallus gallus</i>

atrium. Cirrus covered with delicate spines. Vas deferens strongly coiled at proximal end of cirrus sac. Ovary transversely elongated and botryoidal, 0.140–0.175 across. Vitelline gland trilobate, 0.098 long by 0.049–0.056 wide, located ventral to testes at posterior field of segment. Seminal receptacle transversely elongate, 0.077 by 0.028, situated dorsal to ovary on poral side. Uterus occupying entire segment when fully developed. Eggs oval or spherical, 0.046–0.053 by 0.032; onchospheres spherical, 0.023–0.028 by 0.021; embryonal hooks 0.011 long.

Host: *Urotrichus talpoides hondnis* Thomas, 1908.

Site infection: Small intestine.

Locality and date: Ogurogawa, Ina-shi, Nagano Prefecture; October 8, 1988.

Type specimen: Holotype: NSU Lab. Coll. No. 9009; Paratypes: No. 9010.

Remarks: Out of known 24 species of the genus *Amoebotaenia* from domestic and wild birds, four have 10–12 rostellar hooks (Table 1) [2, 13–15]. *Amoebotaenia urotrichi* sp. n. differs from all of them in the length and shape of rostellar hooks (Fig. 22). This is the first record of the genus *Amoebotaenia* from wild animals.

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