

**On a New Species of the Genus *Pseudanoplocephala*
Baylis, 1927 (Cestoda : Anoplocephalidae)
from the Wild Boar in Japan**

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Species of the genus *Pseudanoplocephala* Baylis, 1927, hitherto reported is only *P. crawfordi* from a wild boar in Ceylon (Baylis, 1927) and from pigs in India (Mudaliar, 1938). The authors reported the occurrence of pseudanoplocephaline tapeworm from a wild boar, *Sus scrofa leucomystax* Temminck et Schlegel, 1942, in Japan (Hatsushika *et al.*, 1977), but the definite identification about this tapeworm was not clarified in the report because of the insufficient number of specimens examined. Thereafter, forty-four specimens of the same tapeworm were discovered for the second time from the intestine of another wild boar captured at the same locality as the previous one. After detailed examinations of the present tapeworms comparing with *P. crawfordi* Baylis, 1927, we concluded that the present tapeworms differ from *P. crawfordi* in some morphological characters.

The tapeworms were removed from the small intestine and preserved in a solution of 10% formalin. Suitable worms were washed in running water overnight, and stained with Semichon's carmine and prepared as whole mount specimens. Some mature proglottides were serially sectioned at 10 μ m in each direction (transverse, sagit-

tal, and horizontal) and stained with Trichrome solution. The species name, *nipponensis*, represents the locality where the animal hosts were captured.

Pseudanoplocephala nipponensis n. sp.
(Figs. 1-6 and Photos. 1-10)

The measurements are based on eight stained worms of whole mounted specimens and ten slides of the sections in each direction of mature proglottides.

Description: Measurements of each part of the specimens are given in Table 1. The worms measure 357 to 747 mm (av. 563) in length and 5 to 6 mm (av. 5.7) in maximum width. The scolex is relatively small, and measures 0.266 to 0.399 mm (av. 0.377) in length and 0.266 to 0.386 mm (av. 0.322) in transverse diameter. The neck measures 0.102 to 0.246 mm (av. 0.194) in width. The suckers are directed upwards, measuring 0.199 to 0.153 mm in diameter. All the proglottides are much wider than long. The lateral margins of proglottid slightly serrate, the serrations show more distinctly at the mature proglottides. The maximum length of a gravid proglottid is about 1.33 to 1.67 mm (av. 1.49). The outer longitudinal musculatures are well developed. The muscle bundles are irregular in form, situated in the cortical parenchyma, and contain about 30 to 50 longitudinal muscle fibers

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Table 1 Comparison of the morphological data of *Pseudanoplocephala crawfordi* Baylis, 1927 with those of the new species

| | Baylis (1927) | Mudaliar et Iyer (1938) | <i>P. nipponensis</i> n. sp. |
|-------------------------|----------------|-------------------------|---------------------------------|
| Strobila | | | |
| length..... | 200 mm | 210~310 mm | 357~747 mm |
| maximum width..... | 7 mm | 3~4 mm | 5~6 mm |
| Scolex | | | |
| length..... | | | 0.266~0.399 mm |
| width..... | 0.4 mm | 0.45 mm | 0.266~0.386 mm |
| Neck | | | |
| width..... | | 0.35 mm | 0.102~0.246 mm |
| Diameter of suckers. | 0.13~0.14 mm | 0.10~0.14 mm | 0.119~0.153 mm |
| Cirrus-sac | | | |
| length..... | 0.55~0.6 mm | | 0.172~0.489 mm |
| width..... | 0.07 mm | | 0.053~0.093 mm |
| Seminal vesicle | | | |
| length..... | | | 0.28 mm |
| width..... | | | 0.091 mm |
| Diameter of testes..... | | | 0.066~0.143 mm |
| No. of testes | | | |
| per segment..... | 26 or 27 | 25~26 | 25~39 |
| poral side..... | 7~10 | | 9~18 |
| antiporal side..... | 16~19 | | 17~28 |
| Musculature | | | |
| longitudinal..... | well developed | | well developed |
| transverse..... | absent | | absent |
| Size of eggs | | | |
| egg shell..... | 0.098~0.110 mm | 0.10 mm | 0.071~0.088 mm |
| embryophore..... | 0.045~0.060 mm | | 0.034~0.061 mm |
| Embryonic hooks | | | |
| length..... | 0.025 mm | | 0.020~0.022 mm |

each. No transverse musculatures are observed. A single pair of longitudinal excretory canals runs the full length of the strobila and lies just the inside of the lateral margins of proglottid. The dorsal excretory canals are absent. The transverse excretory canal runs the posterior end of proglottid, connecting the left and the right longitudinal excretory canals at the ventral side of each proglottid.

A single set of the reproductive organs is situated in the poral half of each proglottid. The genital atrium is weakly marked. The genital pore is strictly unilateral and on the

right side of proglottid, and the cirrus opens on the anterior half of the lateral margin. The vagina opens independently on the ventral side of the cirrus opening, and extends a large receptaculum seminis with several dorso-ventral loops to the median field of the proglottid. Male and female genital ducts run dorsally to the longitudinal excretory canal of the poral side. Cirrus-sacs elongate, measuring 0.172 to 0.489 mm (av. 0.325) in length, and 0.053 to 0.093 mm (av. 0.079) in width at mature proglottides. Seminal vesicle situated on just inside of the cirrus-sac is relatively large, measuring

about 0.28 mm in length and 0.091 mm in width. The vas deferens is a narrow tube which runs toward the median field of the proglottid without coiling.

The female genital organs are situated in the median field of the proglottid. The ovary is multilobed, and situated very close to the ventral surface of the receptaculum seminis in the sagittal sections. The vitelline gland is also lobated, and located underneath the ovary. The egg-shell gland "the ootype" in the sagittal sections is located directly under the receptaculum seminis. The uterus in mature proglottides is an elongated sac with numerous outpockets in each direction and contains many ova.

The testes are arranged in a single layer, and distributed as a whole with of medullary parenchyma across the longitudinal excretory canals on each side of the proglottid. Subspherical testis measures about 0.066 to 0.143 mm in maximum diameter at mature proglottides. The testis 25 to 39 (av. 34) in number; 9 to 18 (av. 11) in the poral side and 17 to 28 (av. 22) in the antiporal side.

The eggs are approximately spherical in shape with a rough shell surface. The eggs measure 0.071 to 0.088 mm (av. 0.079) in diameter. The embryophore is not a pyriform apparatus, measuring 0.034 to 0.061 mm (av. 0.043) in diameter. There is a thin membranous envelope between the egg shell and the embryophore. The embryonic hooks measure 0.020 to 0.022 mm (av. 0.021) in length.

Host: *Sus scrofa leucomystax* Temminck et Schlegel, 1942.

Habitat: Small intestine.

Locality and date: Hosono, Niimi City, Okayama Prefecture, Japan; November 28, 1976.

Holotype: In the Department of Parasitology, Kawasaki Medical School, Kurashiki City, 701-01, Japan. Slides WB 5201 A(1)-A(11).

Paratypes: In the Meguro Parasitological Museum, Tokyo, 153, Japan. Slides WB 5201 B(1)-B(27), and in the Department of

Parasitology, Kawasaki Medical School, Kurashiki City, 701-01, Japan. Slides WB C(1)-C(46) including sectioned slides.

Discussion

Previously, the authors reported that the pseudanoplocephaline tapeworms were obtained for the first time from a wild boar in Japan. However, the specific name of these tapeworms was unable to given, because the number of examined specimens was only three (Hatsushika *et al.*, 1977). Since then, fifty-one specimens in all were obtained from six wild boars captured at the same areas as the first and the second cases. The worms of the second case were used in the present report. Results of the careful examination about eight specimens out of forty-four from the second case, seem to substantiate that a new species was established.

The tapeworm of the genus *Pseudanoplocephala* has been newly established by Baylis (1927) based on the specimens from a wild boar, *Sus cristatus*, in Ceylon. *P. crawfordi* Baylis, 1927 is only one species of the genus *Pseudanoplocephala* hitherto reported. Subsequent to Baylis' report, additional specimens were reported from the intestine of domestic pigs in India by Mudaliar et Iyer (1938).

The morphological features of the present tapeworms were comparable to characteristics of the genus *Pseudanoplocephala* Baylis, 1927, on the following points, such as a single set of reproductive organs in each proglottid, the genital ducts passing dorsally to longitudinal excretory canal, the vaginal pore ventral to cirrus-sac, the testes extending in medulla across the longitudinal excretory canals on each side of proglottid, the female genital organs being median, the uterus sac-like structure, and the eggs without pyriform apparatus.

The new tapeworm very closely resembles *P. crawfordi* Baylis, 1927, but it differs from *P. crawfordi* in the size of scolex, in the arrangement of longitudinal musculatures, in the number of testes, in the diame-

ter of egg shell, in the length of embryonic hooks as well as the geographical location. The difference of the present tapeworm from *P. crawfordi* may be described as follows.

The scolex of the present tapeworms is slightly smaller than that of *P. crawfordi*, and also the whole length of the strobilae seems to be much longer than that of *P. crawfordi*. It may be stated in this connection that the strobilae of the new species before the fixation measures 100 to 1640 mm (av. 557) in length and 3.5 to 7.5 mm (av. 5.4) in maximum width in normal saline, but as mentioned above the records for the new species were taken of the materials fixed in a solution of 10% formalin.

The arrangement of the longitudinal musculatures of the present tapeworms differs entirely from that of the figure of Baylis' paper. The longitudinal musculature of the present specimens in transverse sections seems to be scattered with small bundles of an irregular form in the cortical parenchyma, and each bundle contains 30 to 50 fibers of the longitudinal muscle. As for the number of testes per proglottid, the present specimens had evidently more than that of *P. crawfordi*. The eggs are similar to those of *P. crawfordi* but the diameter of egg shell and the length of embryonic hooks are evidently less than those of *P. crawfordi*. Especially, it seems to suggest that the difference in the length of embryonic hooks has specific characteristics, as it is not appreciably affected by the fixing fluid.

Summary

A new tapeworm, *Pseudanoplocephala nipponensis* n. sp. from the small intestine

of the Japanese wild boar, *Sus scrofa leucomystax* Temminck et Schlegel, 1942, is described. The present new species closely resembles *Pseudanoplocephala crawfordi* Baylis, 1927, but it differs markedly in the size of scolex, in the arrangement of longitudinal musculatures, in the number of testes, in the diameter of egg shell and in the length of embryonic hooks. The morphological characteristics of the new species are illustrated with some photographs.

Acknowledgments

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ニホンイノシシから得た偽裸頭条虫の一新種について

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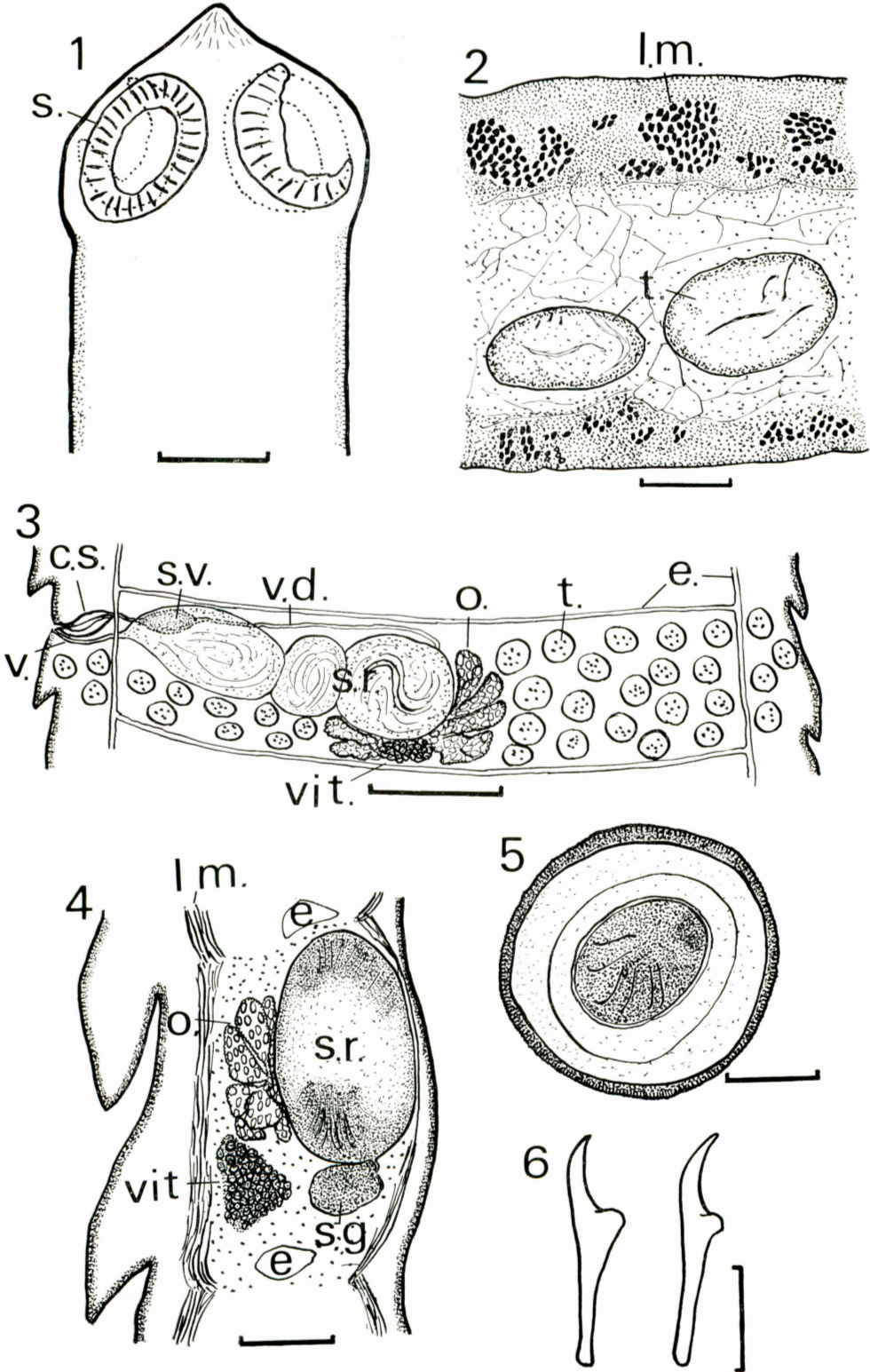
沢田 勇

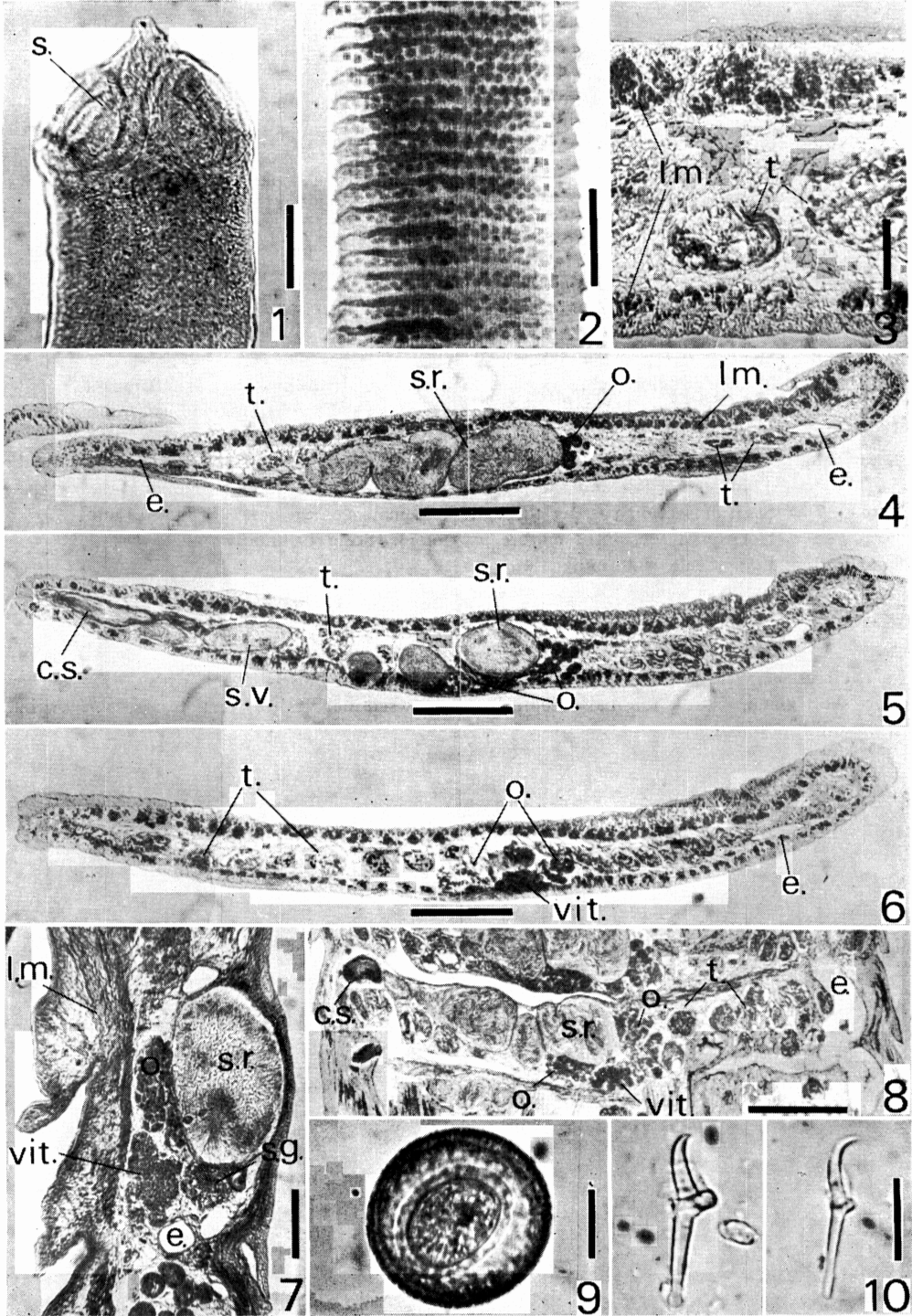
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著者らは、さきに岡山県新見市法僧産ニホンイノシシの小腸から、裸頭条虫科、偽裸頭条虫属の条虫3個体を見出し、現在この属のものとしてただ1種セイロン産イノシシから記録された *Pesudanoplocephala crawfordi* Baylis, 1927 との比較を試みたが、当時、個体数が少なかったので、*P. crawfordi* との異同については結論を差し控えていた。

その後、上記と同じ地区で捕獲されたイノシシから再び同様の条虫44個体が見いだされたのに続いて、今日までに同地産のイノシシ6頭中5頭から合計51個体(1頭当りの虫体寄生数1~44)が得られた。これらの虫体に

ついて、頭節・成熟節および虫卵の形態を詳細に観察し、*P. crawfordi* と比較検討した結果、これらの条虫は偽裸頭条虫属の特徴を具備していることが判明した。その概観は *P. crawfordi* に似ているが、1) 頭節が小さいこと、2) 皮質層に存在する縦走筋が束状を呈していること、3) 1片節当りの睾丸数が多いこと、4) 虫卵における卵殻直径が小さいこと、および5) 六鉤幼虫にみられる鉤の長さが短いこと等の点で *P. crawfordi* とは明らかに区別できるとの結論に達し、*Pseudanoplocephala nipponensis* と命名記載した。和名としては「ニホン偽裸頭条虫」を提唱したい。





Explanation of Figures

Figs. 1-6 *Pseudanoplocephala nipponensis* n. sp. from the Japanese wild boar, *Sus scrofa leucomystax* Temminck et Schlegel, 1942.

1. Scolex (Scale=0.1 mm);
2. Transverse section of mature proglottid to show details of the longitudinal musculatures (Scale=0.05 mm);
3. Horizontal section of mature proglottid (Scale=0.1 mm);
4. Sagittal section of mature proglottid to show the female genitalia (Scale=0.1 mm);
5. Egg (Scale=0.05 mm);
6. Embryonic hooks (Scale=0.01 mm).

Explanation of Photographs

Photos. 1-10 *Pseudanoplocephala nipponensis* n. sp. from *Sus scrofa leucomystax* Temminck et Schlegel, 1942, in Japan.

- Photo. 1 Scolex. (Scale=0.1 mm)
- Photo. 2 Mature proglottides stained with Semichon's carmine. (Scale=1.0 mm)
- Photo. 3 Portion of transverse section to show details of longitudinal musculatures. (Scale=0.05 mm)
- Photos. 4-6 Transverse sections of mature proglottid, showing the anterior level (4), the middle level (5), and the posterior level (6) each. (Scale=0.3 mm)
- Photo. 7 Sagittal section passing through the female genital area. (Scale=0.1 mm)
- Photo. 8 Horizontal section of mature proglottid. (Scale=0.4 mm)
- Photo. 9 Egg. (Scale=0.01 mm)
- Photo. 10 Embryonic hooks. (Scale=0.03 mm)

Reference letters in Figures and Photos

c. s. : cirrus-sac, e. : excretory canal, l. m. : longitudinal muscle, o. : ovary, s. : sucker, s. g. : shell gland, s. r. : seminal receptacle, s. v. : seminal vesicle, t. : testes, v. : vagina, vit. : vitelline gland.