

A New Nematode of the Genus *Pseudophysaloptera* from an Okinawan Shrew

DAVID R. LINCICOME AND BAYARD H. MCCONNAUGHEY¹

INTRODUCTION

TWO SHREWS, identified as *Suncus murinus riukiuanus* (Kuroda), collected on Okinawa Shima, Ryukyu Islands, were examined for parasites in August, 1945. A large number of nematodes were taken from the stomach, peritoneal cavity, connective tissue in axillae of the hind legs, and the pericardial cavity. Two species are probably represented, one of which forms the basis of this report. It was taken from the stomach of each of the two hosts. The writers are indebted to Dr. Frank N. Young² for collection and identification of the shrews.

Specimens were studied largely as wet whole mounts in glycerine or lactophenol. The pattern of the caudal papillae in the male was determined by dissection of more than a dozen specimens. The terminal portion of the body was severed just anterior to the bursa and removed to a glass slide in lactophenol. After removal of the membranous bursa the tail was flattened with ventral side uppermost and held in place by a cover glass. The papillae were then examined under the microscope.

The worms are apparently members of the genus *Pseudophysaloptera* Baylis 1934 (family Physalopteridae Leiper, 1908, subfamily Physalopterinae Railliet, 1893) and have been heretofore unrecognized in the literature. The name *Pseudophysaloptera riukiwana* is therefore proposed.

¹ Department of Medical Microbiology, University of Wisconsin, Madison, Wisconsin, and Department of Zoology, University of California, Berkeley, California, respectively. Manuscript received March 22, 1948.

² Assistant professor of zoology, University of Florida.

DESCRIPTION OF SPECIES

Pseudophysaloptera riukiwana n. sp.

General: Body white or opaque; cuticula inflated at anterior end to form a collar in both sexes (see Fig. 1, *d*); two large labia each bearing two prominent submedian papillae and median amphid (see Fig. 1, *d*); three bluntly rounded teeth on the internal surface of each lip, these teeth appearing to originate from a common base in oblique *en face* views. The cuticular surface reflected over the lips appears denticulated as it becomes minutely folded. Esophagus very long and composed of two parts: anterior portion short, muscular; posterior long, glandular. Cervical papillae not observed. Nerve ring located at level of caudal half of the anterior part of esophagus.

Female: Body length, 14.5–28.0 mm.; body width, 0.65–1.2 mm. Collar width, 0.27–0.44 mm. Distance to nerve ring, 0.32–0.97 mm. Distance to excretory pore, 0.7–1.8 mm. Esophagus: total length, 3.38–5.0 mm.; length and width of anterior part, 0.47–0.88 × 0.13–0.22 mm.; width of posterior part, 0.2–0.43 mm. Prominent, saddle-shaped constriction of body marking site of vulvar opening, located in the anterior half, third, or fourth of body. Uterus didelphic in type (see Fig. 1, *c*). Eggs 46–52 μ in length and 26–28 μ in width, with thick hyaline shells and embryonated *in utero*.

Male: Body length, 9.5–14.0 mm.; body width, 0.43–0.7 mm. Collar width, 0.22–0.38 mm. Distance to nerve ring, 0.32–0.42 mm. Distance to excretory pore, 0.47–0.65 mm. Esophagus: total length, 2.49–3.91 mm.; length and width of anterior part, 0.41–0.61 × 0.09–0.18 mm.; width of posterior part, 0.14–0.50 mm. Caudal

papillae (see Fig. 1, *a*) all sessile; 6 pairs on ventrolateral surface posterior to ano-genital opening, 1 large, unpaired, immediately anterior to the ano-genital pore, 2 additional pairs anterior and lateral to this opening. No spicules observed either in free specimens or those *in copulo*.

DISCUSSION

At the time he recognized the genus *Pseudophysaloptera* in 1934, Baylis described *P. soricina* from a species of *Crocidura* collected in the Tanganyika Territory, Africa, which, to the writers' knowledge, is the only species that has been ascribed to the genus.

P. soricina, however, has been recorded from other hosts by other investigators. In 1937 Chen reported this organism from "*Suncus coeruleus*," a shrew from South China. Baylis again recorded *P. soricina* in 1944 "from *Suncus coeruleus kandianus*" in Ceylon. Later Crusz (1946) described the worm from the musk shrew, "*Suncus caeruleus*," in Ceylon.

The first American finding of this helminth was made by Morgan (MS.), who reported it in the Masked Shrew, *Sorex p. personatus*, and in the Smoky Shrew, *Sorex f. fumeus*, in Tennessee, Kentucky, Wisconsin, and Iowa. A few females tentatively assigned as *P. soricina* by Morgan were also collected from the Short-tailed Shrew, *Blarina brevicauda brevicauda*.

Specific differences in the genus *Pseudophysaloptera* apparently are chiefly concerned with the male organism. The pattern of the caudal papillae on the ventral surface offers a basis for the separation of *P. soricina* and *P. riukiwana*.

Baylis records four pairs of caudal papillae, all of which are typically sessile, post-anal, and lateral. Baylis has kindly sent one of us (D.L.) a pair of the cotype specimens for examination and comparison. We have confirmed four pairs of post-anal papillae (see Fig. 1, *b*), but believe that there may be an additional lateral pair slightly anterior to the ano-genital opening. This pattern is in contradistinction to the six lateral post-anal pairs, the single, large

ventromedian pre-anal, and the two lateral pre-anal pairs of papillae in the species at hand.

The expanded cuticular collar at the anterior end of both sexes may be of significance. Baylis (1934) states, "The head (fig. 4) has the same structure as in *Physaloptera*, consisting of two hemispherical lateral lips, followed by a wider neck, the cuticle of which forms a collar." At the same time, Baylis (*op. cit.*, fig. 4, page 347) shows little evidence of what the writers interpret as a "collar" although a relatively small proportion of the extreme anterior end is shown. Examination of a cotype female loaned by Dr. Baylis reveals no prominent inflation such as is present on *P. riukiwana* (see Fig. 1, *e*).

There are other differences in body length, distance to nerve ring, and total length of esophagus that may be related to the degree of contraction of the worms at fixation. The forms under consideration here were generally well fixed and well relaxed. Both specimens loaned by Baylis were in a marked degree of contraction.

Chen (1937) and Crusz (1946) have both recorded *P. soricina* from shrews in China and Ceylon, but their descriptions seem to offer some doubt as to their specific identifications. The papilla pattern of the male in both instances is described as "numerous." Crusz's Figure 5 (page 63) shows at least a dozen large and small papillae in scattered and irregular distribution on each side over the ventral surface. The number and distribution of the caudal papillae of the male are markedly different here from *P. riukiwana*. With reference to this point, in a personal communication under date of March 1, 1948, Baylis stated, "I have examined one of Mr. Crusz's specimens . . . I am not at all convinced that all the small 'papillae' shown in his figures are really papillae at all. I think many of them are subcuticular structures . . ."

As further evidence of a possible difference between *P. soricina* of Chen and Crusz and the present material, the absence of spicules might be cited. Chen (1937: 428) states, "Spicules

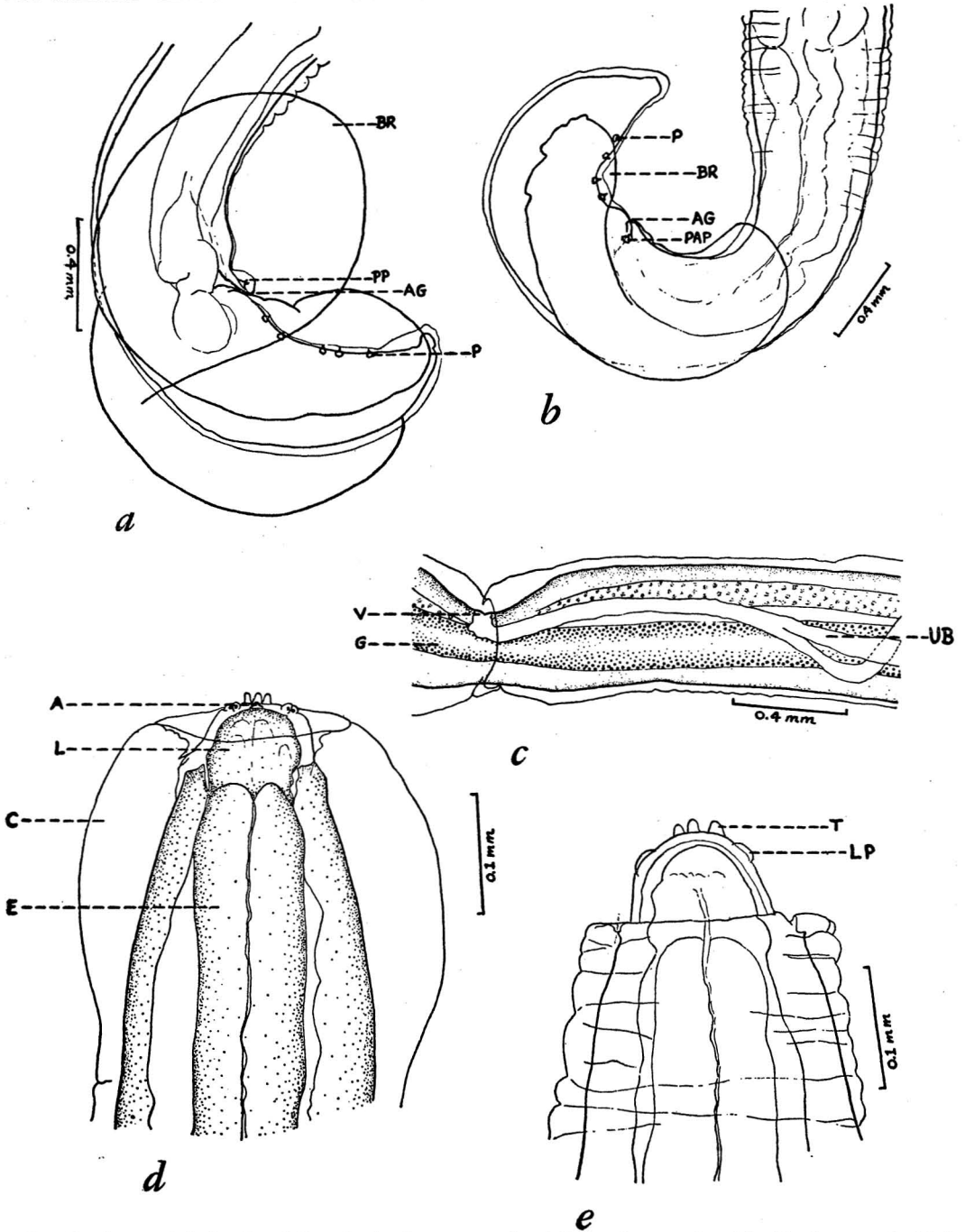


FIG. 1. Anatomical details of *Pseudophysaloptera* species (all drawings made with aid of camera lucida). *a*, Lateral view of posterior end of male *Pseudophysaloptera riukuiana*. (Five post-anal and a single pre-anal papillae are shown. The full pattern [2 pre-anal pairs, 1 single pre-anal and 6 post-anal pairs] could not be demonstrated in every male because of the opaqueness of this area of the body.) *b*, Lateral view of posterior end of cotype male *Pseudophysaloptera soricina* Baylis 1934. *c*, Lateral view of region of vulva of female *Pseudophysaloptera riukuiana* showing didelphic uterus. *d*, Lateral view of anterior end of male *Pseudophysaloptera riukuiana*. *e*, Lateral view of anterior end of cotype female of *Pseudophysaloptera soricina* Baylis 1934. A, amphid; AG, ano-genital opening; BR, bursa; C, collar; E, esophagus; G, gut; L, lip; LP, labial papilla; P, post-anal papilla; PAP, paired pre-anal papilla; PP, single pre-anal papilla; T, labial tooth; UB, uterine branch; V, vulva.

(?) indistinct, in the form of two barely discernible structures, equal, pointed at both ends, 0.15 mm. long." Crusz (1946) on the other hand states, "A very distinct pair of spicules present in one worm; slender, well 'chitinized,' unequal, pointed anteriorly, and blunt or probably broken off posteriorly. Right spicule 0.231 mm. long, left spicule 0.190 mm. long. No trace of any spicules in the other two worms." In the same personal communication referred to above, Baylis has "carefully examined, with Mr. Crusz, the specimens from which he made his drawing showing 'spicules.' The structures he shows as such are certainly there, and in the position in which they are shown. They appear to be unquestionably *internal*, and not (as I had half expected) lying on the surface of the preparation . . . My own suggestion is that they do not belong to this specimen at all, but to some other nematode (possibly *Castronodus strassenii* Singh, 1934 which occurs in nodules of the stomach of the same host), which had somehow inserted them and had them broken off."

There is no evidence of the presence of spicules in any of the males in the present collection.

REFERENCES

- BAYLIS, H. A. 1934. On a collection of cestodes and nematodes from small mammals in Tanganyika Territory. *Ann. and Mag. Nat. Hist.* X, 13: 338-353.
- 1944. Notes on some parasitic nematodes. *Ann. and Mag. Nat. Hist.* XI, 11: 793-804.
- CHEN, H. T. 1937. Some parasitic nematodes from mammals of South China. *Parasitology* 29(4): 419-434.
- CRUSZ, HILARY. 1946. Contributions to the helminthology of Ceylon. II. Notes on some parasitic nematodes, with a description of *Anisakis tursiopsis* sp. nov. *Ceylon Jour. Sci.* (B) 23 (2): 57-66.
- MORGAN, B. B. MS. The Physalopterinae (Nematoda) of North American Vertebrates. [Manuscript Thesis, University of Wisconsin Library, Madison, Wisconsin.]