

Parasitic Nematodes of Snakes, *Ophidascaris* and *Polydelphys* (Nematode: Ascarididae) From Sumatera and Java, Indonesia

Endang Purwaningsih^{1*}, Mumpuni², Tony Febri Qurniawan³

^{1,2}Zoological Division of Research Center for Biology-Indonesian Institute of Sciences, Widyasatwaloka Building, Jl. Raya Jakarta Bogor Km 46, Cibinong 16911, Indonesia

³Faculty of Biology, Gadjah Mada University Yogyakarta 55281, Indonesia

*Corresponding author: Endang Purwaningsih

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Abstract

Original Research Article

The morphology of three new record species of parasitic nematodes found in Indonesian snakes are described: *Ophidascaris infundibulicola* (Linstow, 1903) Freitas, 1967; *O. trichuriformis* Vas, 1935 and *Polydelphys anura* Duj., 1845 from Medan, Rantau Prapat, Sumatera; and *O. trichuriformis* from *X. melanozostus* from Imogiri Java, Indonesia. The morphological features of each nematode were observed using light and scanning electron microscopes. Measurements are given in micrometers (μm) as the mean followed by the range in parentheses unless otherwise stated.

Keywords: Nematode, *Ophidascaris*, *Polydelphys*, snake, new record, Indonesia.

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INTRODUCTION

Many species of snakes are indigenous to Indonesia. They are found in the wild and not usually domesticated. Sometimes hunted individually or rounded up, a wide variety of species of native snakes are often slaughtered so components ranging from skin and blood, to meat, bile and venom can be harvested. Snake skin is commonly used to produce high-end bags, shoes and similar commodities, while meat, venom, blood, and bile can be used for purposes including research, anti-venin production, folk medicines and aphrodisiacs [5]. Native animals such as snakes may carry nematode parasites which can be transmitted to humans, either through direct contact and handling, or indirect contact via environmental contamination. Such transmission may potentially occur during the preparation process [1], so it is therefore important to identify the various species of parasitic nematodes which may infect the native wild snakes.

Some species of parasitic nematodes of snakes have been reported in Indonesia. These include *Ophidascaris wui* which infects the Komodo dragon, *Varanus komodoensis* native to Komodo Island [9]; *Kalicephalus indicus*, *K. bungari* from *Ptyas mucosus* and *Naja sputatrix* from Java; and *K. assimilis* from *Ophiophagus hannah* in Kalimantan [10]. The genera *Ophidascaris* and *Polydelphis* (Nematode: Ascarididae) have been reported to have been found in some species of snake, lizards and amphibians [3, 12, 13]. The most

recent information about *Ophidascaris* is a report of *O. excavata* in China [7]. During a survey of snakes obtained for trading purposes in Sumatera and Java, several species of parasitic nematodes have been collected, and the species found are described in this paper.

MATERIALS AND METHODS

Specimens observed were collected from intestines of *Python curtus* and *P. reticulatus* in Medan, Rantau Prapat, North Sumatera and *Xenochrophis melanozostus* in Imogori, Central Java (Tabel 1). The nematodes found were fixed with warm 70 % alcohol, then preserved in that solution. Specimens were cleaned and wet mounted on slides using lactophenol, prior to observation under a compound microscope. Drawings were made with the aid of a drawing tube attached to the compound microscope. Specimens to be observed using the scanning electron microscope were fixed in cacodylate buffer and glutaraldehyde solution, dehydrated through a graded alcohol concentration series (starting with 70% concentration and ending at absolute), and dried using a vacuum drier. The dried specimens were then attached to stubs using silver double sided cello tape, coated with gold for 5 minutes in an IB-2-Eiko sputter coater and observed using a Jeol Scanning Microscope-5310 Low Vacuum electron microscope. Measurements were given in micrometers as the means followed by the range in parentheses, unless otherwise stated. The specimens have been

deposited in Museum Zoologicum Bogoriense (MZB), Indonesia.

RESULTS

The species of nematodes found from snakes in Sumatera and Java have been identified and presented in Table 1.

Table-1: Species of snakes correlated with the parasitic nematodes found

| Species of snake | Species of nematode | Locality |
|----------------------------------|-------------------------------------|-------------------------------|
| <i>Python curtus</i> | <i>Ophidascaris infundibulicola</i> | Medan, North Sumatera |
| <i>P. reticulatus</i> | <i>Polydelphys anura</i> | Rantau Prapat, North Sumatera |
| <i>Xenochrophis melanozostus</i> | <i>O. trichuriformis</i> | Imogiri, Central Java |

Description

Ophidascaris infundibulicola (Linstow, 1903) Freitas, 1967

The body length of this species of nematode measures 85 (82–90) mm, width 1,192 (1,150–1,225) in the male, and both sexes are wider at the posterior end. Striae are apparent on the cuticle surface. The anterior end has three rectangular lips which are approximately equal in size, longer than wide, with deep grooves at the base of the lips (Figure 1 A, B). Two sub lateral lips have one large papilla, an amphid and a noticeably smaller papilla next to it (Figure 1C), and the dorsal lips have two large papillae. Dentigerous ridges are present at the internal anterior end of each lip (Figure 1D). The interlabia are conical at the tips and less than half as long as the lips. The nerve ring is located at the anterior extremity and an excretory pore is located behind that. The esophagus is tubular without diverticula. Spicules are tubular, wider at the proximal end, 1950 long, about 2.5–3 times the length of the ejaculatory duct. Caudal papillae number 30–32 including a pair of preanal papillae which are positioned sublaterally, a single papilla found just anterior to the cloaca, a larger pair located toward the anus, 2 pairs located in ventrolateral position behind the cloaca, and 2 pairs which are lateral (Figure 1E). The vulva is located behind the middle of the body. Eggs are rounded, thick shelled, rugose, 85 by 60. The tail is very short, bluntly rounded with a small conical spike, 178 (160–195) long.

Host: *Python curtus*

Site of infection: stomach

Locality: Medan, North Sumatera

Ophidascaris trichuriformis Vas, 1935

The body length of this nematode species is 68 (55–78) mm in the male, 87 (69–111) in the female. The maximum body width is 570 in the male, 1,221 (1,316–1,410) in the female; in both sexes, the widest point is located 1/3 of the distance to the posterior. Striae are apparent on the cuticle surface. The mouth features three large square lips. The dorsal lip is slightly smaller than the two lateral lips; each lip is wider than it is long; and deep grooves are present at the base of the lips (Figures 1F, G). Two sub lateral lips each have one large papilla as well as a noticeably smaller papilla and an amphid located next to it (Figure 1H). The dorsal lip has two large double-ended papillae. Dentigerous ridges are present at the internal anterior end of each lip

(Figure 2 I). The interlabia are triangular with conical tips, and are less than half the size of the lips. The nerve ring is located at the anterior extremity, and the excretory pore is behind that. The esophagus is club shaped without diverticula. Cervical alae are small, and extend from the level of the nerve ring to the esophagus. Spicules are tubular, wider at the proximal end and alate until reaching the tip, measuring 3050–3700 which is approximately twice as long as the ejaculatory duct. The tail of the male is short, bluntly rounded at the end with a mucron at the tip. Preanal caudal papillae number 34–40 and are lateral in position: a single small papilla is located just anterior to the anus, another pair of papillae is found just posterior to the cloaca, two double ended pairs are behind the anus and two pairs are near the tip of the tail (Figures 2 J, K). The tail of the female is very short, bluntly rounded at the tip, and has no spike.

Host: *Xenochloris melanozostus*

Site of infection: stomach

Locality: Imogiri, Central Java

Polydelphys anura Duj., 1845

The body length of this nematode is 5.7 (5.5–5.9) mm in the male and 64.155 (61–80) mm in the female. The maximum width is 1,500 (1,200–1,800) in the male and 674 (621–770) in the female, and the body is wider at the posterior end in both sexes. Striae are apparent on the cuticle. The anterior end features three large lips which are smaller at their base than at the anterior end. Each of the lips is longer than it is wide, and the dorsal lip is a little larger than the other lips (Figures 2 L, M). The interlabia and deep grooves at the base of lips which were noticed in the other nematodes studied are absent in this species (Figures 2 L, 2M). The two sub lateral lips each have one large papilla, an amphid and a noticeably smaller papilla beside it, while the dorsal lip features two large papillae. Dentigerous ridges are present at the internal anterior end of each lip (Figure 2N). The nerve ring is located at the anterior extremity, the excretory pore is behind that, and the esophagus is club shaped without diverticula. Cervical alae are absent. The tail is short, bluntly rounded at the tip, with a stout spike. Preanal caudal papillae are sessile, small, 28–30 in number, and are sub-lateral in position, including a single papilla just in front of the anus which is oval shaped and has a cleft at mid posterior (Figure 2O); 1 pair with two ends found

beside the cloaca (Figure 2 P); 5 pairs found after the cloaca; 2 pairs which are sub-ventral; 2 pairs which are sub-lateral; and a smaller pair which is near the first sub-lateral papilla. The spicule is tubular and slender, alate to the tip. The vulva lies behind the midbody and eggs are rounded, thick shelled and rugose, measuring 85 by

60. The female tail is very short, bluntly rounded with a small spike at the end.

Host: *Python reticulatus*

Site of infection: intestine

Locality: Rantau Prapat, North Sumatera

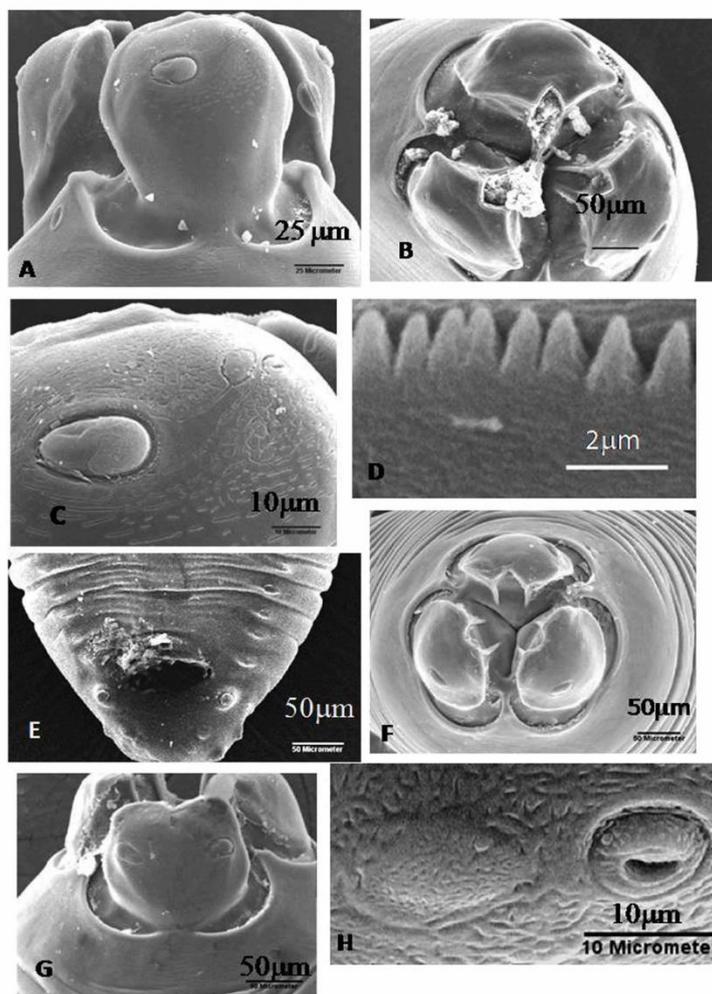


Fig-1

O. infundibulicola

A. Lateral lips, lateral view, showing the shaped of lateral lip

B. Anterior end, en face view, showing the three lips

C. Magnification of lateral labial papillae, lateral view,

D. Ridges, inside buccal capsule, showing the shape of ridges

E. Male tail, ventral view, showing the arrangement of caudal papillae

O. trichuriformis

F. Anterior end, en face view, showing the three lips

G. Dorsal lip, dorsal view

H. Lateral papillae and an amphid, lateral view

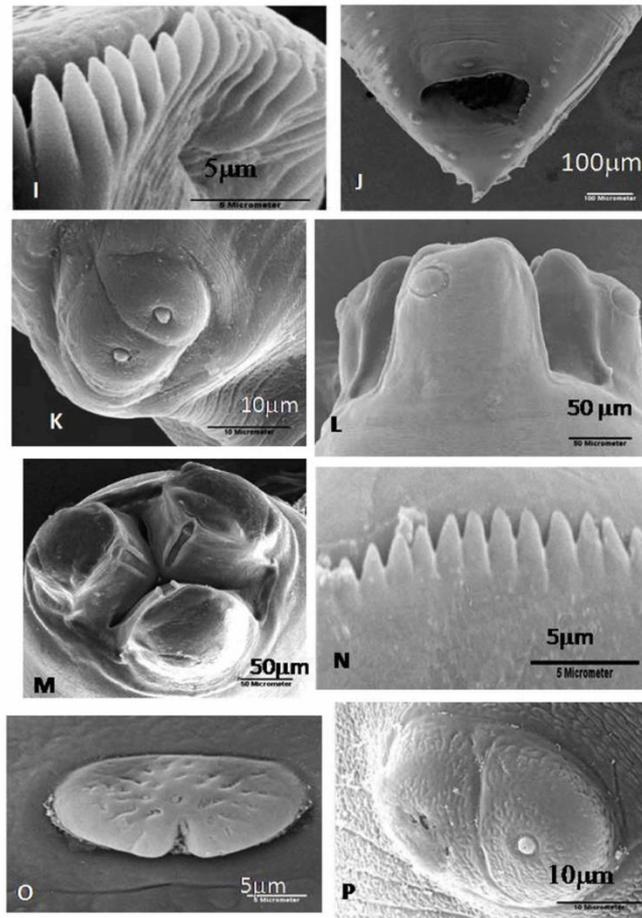


Fig-2

O. trichuriformis

- I. Ridges, inside buccal capsule, showing the shaped of ridges
- J. Male tail, ventral view, showing the arrangement of caudal papillae
- K. Double ad -cloacal papillae, ventral view

Polydelphys anura

- L. Lateral lips, lateral view, showing the shaped of lateral lip
- M. Anterior end, en face view, showing the three lips
- N. Ridges, inside buccal capsule, showing the shaped of ridges
- O. Single papillae, anterior to cloaca, ventral view
- P. Double ad-cloacal papillae, ventral view.

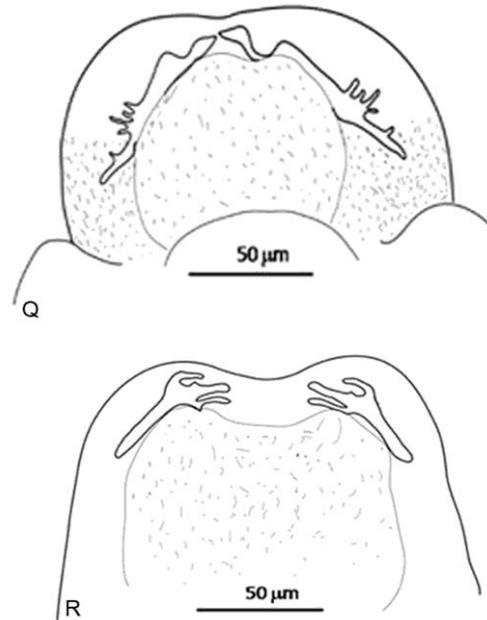


Fig-3

Q. Pulp of lateral lip papillae of *O. infundibulicola*, lateral view

R. Pulp of lateral lip papillae *O. trichuriformis*, lateral view

DISCUSSION

Ophidascaris and *Polydelphis* are members of Family Ascarididae, tribe Ophidascaridinea [4] *Ophidascaris* is distinguishable from *Polydelphis* due to the presence of interlabia and deep grooves at the base of the lips [3, 11]. According to a species key of *Ophidascaris*, *O. infundibulicola* [3] has no lateral alae, the post cloacal region is smooth, the intestine is red with a herringbone pattern, spicules are about 1.5–2 times the length of the ejaculatory duct, and both the male and female have mucronated tails [3]. The body length and width of a typical male is 55 by 830 and a female is 160 by 750, and spicules are 3750 long. Caudal papillae include 15 pairs pre-anal, a single papilla just before the anus, 1 pair behind the anus, and 2 pairs in the middle of the tail [2]. The features mentioned above are also found in *Ophidascaris* which infects *P. curtus*, as noted in the present study. *Ophidascaris* consists of 3 groups: filarial, obconica and arndti [3]. The *O. infundibulicola* species is categorized in the filarial group. This group consists of several species of *Ophidascaris* with square or oval lips, which have been observed in *Python reticulatus* in Thailand and *P. curtus* in Malaya [3]. Finding *O. infundibulicola* infecting the *P. curtus* snake is a new record in Indonesia.

Ophidascaris which was found in the *X. melanozostus* snake has the same morphological characteristics as *O. trichuriformis* in terms of the

anterior end structure, spicule shapes, and the arrangement and number of caudal papillae, with two pairs located near the tip of the tail. *O. trichuriformis* has been reported before in Brazil infecting snakes (*Liophis miliaris* and *Xenodon merremii*) and other host species (*X. newwiedii*, *X. colubrinus*, *Waglerophis merremii*, *Erythrolamprus aesculapii*, *Leptodeira annulata*, *Thamnodynastes pallidus*, *Leimadophis poecilogyrus*, *Lastrophis dorbignyi*, and *Boa constrictor mexicanus*[3].

Some authors use the pulp of the lips and the ratio of spicules to ejaculatory duct to identify the individual species of *Ophidascaris*, but others ignore those characteristics. The pulp is probably characteristic of the *Ophidascaris* species, however it is difficult to observe. The pulp of *O. infundibulicola* and *O. trichuriformis* is not mentioned in the previous description [11, 12]. *O. infundibulicola* observed in the present study have labial pulp with simple antero-median processes, and the postero-marginal processes are longer with radiating fibers (Figure 3Q). However, *O. trichuriformis* have labial pulp with a three branched antero-median process and simple, long postero-marginal processes, with a conical tip (Figure 3R). The ratio of spicules to ejaculatory duct in *O. trichuriformis* in the original description is 2:1 which matches the *O. trichuriformis* in the present study; however, there is no such information available for *O. infundibulicola*.

Polydelphis spp has been described as found in snakes in India [2] such as *P. attenuata*, *P. oculata*; Railliet & Henry, *P. brachyceilos*, *P. sewelli*, *P. rotundicaudata*. The genera of *Polydelphis* in the present study is similar to *P. anura* in having 3 lips

without interlabia, the same type of cephalic papillae, the same shapes for the male and female tails, spicules measuring approximately 10–11 % of BL, and the same number and arrangement of caudal papillae. The body length for *P. anura* is shorter than that described for *P. anura* found in *P. morulus* in India, Africa and America [2]. *P. anura* is also shorter than the *P. attenuate* from *P. morulus* and *P. reticulatus* from India, Malaya and Africa, which is considered equivalent to *P. anura* [3]. Some species of *Ophidascaris* without interlabia and postlabial grooves have been described, such as *O. natrix* from *Natrix tigrina* in Japan [12], *O. freitasi* Hoa & Lien, from *N. piscator* in Vietnam, and *O. durissus* [8] in *Crotalus durissus* in Brazil. An Ascarid with the above characteristics is differentiated from *Ophidascaris* [11, 12]. *O. durissus* was also considered, but it does not belong to *Ophidascaris* [6]. *P. anura* is a new record in Indonesia, although recently this species has been found in India, Vietnam and Brazil as well as Indonesia.

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