

# CASE REPORT

## *DIPLOSCAPTER CORONATA* INFECTION IN THAILAND: REPORT OF THE FIRST CASE

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**Abstract.** A 73-year-old Thai woman living in Mueang District, Saraburi Province, central Thailand presented with numerous hookworm-like nematodes, finally revealed as *Diploscapter coronata*, by fecal culture. The patient exhibited no significant clinical signs of the gastrointestinal or genitourinary systems, and was generally not ill as a result of this unusual infection. Less commonly, patients have presented with symptoms and signs of *Diploscapter coronata* infection. However, potentially serious consequences can occur where people have exposure to an environment that has been contaminated with infected feces, or more specifically, infective eggs; such conditions could lead to human infection with *Diploscapter coronata* worms. This was the first reported occurrence of human *Diploscapter coronata* infection in Thailand.

### INTRODUCTION

This small nematode was first described by Cobb (1893) under the name *Rhabditis coronata*, from a single female specimen found in a human around the roots of a banana plant on Fiji Island. De Man (1895) found only numerous single male worms in the diseased pseudo-bulbs of tropical orchids. Zimmerman (1898) and Maupas (1900) added more information about the morphology of the worm, then Cobb (1913) reviewed and established a new genus: *Diploscapter*. Peters (1930) also found it in sewage beds in England and supported Cobb's work. The parasite was then known as *Diploscapter coronata*, which was originally not infectious, but merely a saprophyte living in soil around ruined plants and roots. Its life cycle was later discovered to be as follows: adult worms generally inhabit the stomach wall of cats, dogs and tigers, and are infrequently found as human parasites; the mature female worms produce fertilized ova that are excreted with the host's feces; eggs are flushed by rain into ponds, canals and rivers, where they hatch into first-stage larvae; the infective larvae are then ingested. After the life cycle was established, only a few case reports appeared in the literature over subsequent decades because human infection was not common.

In Japan, these worms were found in the urinary sediment of an old female suffering from acute pyelonephritis (Yokogawa, 1936). Most of the clinical manifestations of human *Diploscapter* infection are not yet known due to limited information; thus, there is a need for more studies. Moreover, there was no

information on *Diploscapter* infection in Thailand until now.

### CASE REPORT

A 73-year-old single Thai female from Mueang district, Saraburi Province, central Thailand had a health check-up with the parasite control program of the Faculty of Tropical Medicine, Mahidol University. She used to move around and live in Ko Samui district and Phunphin district, Surat Thani Province, for 6 and 2 months, respectively, in early 1994. She had a habit of consuming a local Thai dish called "Laab Moo," and sometimes excreted feces in the jungle. Microscopic examination of the feces demonstrated hookworm-like eggs which were oval in outline, possessed one thin single shell with one yolk cell inside, and measured about 48-50  $\mu$  by 21  $\mu$ . The feces sample was cultured for 3 days. Thereafter, numerous, active, small hookworm-like nematodes of various sizes were found (Fig 1). The worms closely resembled parasites described by Peters (1930) and Yokogawa (1936). After careful examination, they were finally identified as *D. coronata*.

Once informed consent was obtained, the patient was further studied. Physical examination revealed no fever and no obvious clinical features. She had a past history of dyspepsia and constipation, good nutritional status, and normal pharynx and tonsils. No abnormal sounds of the heart or lungs, and no tenderness or masses of the abdomen were observed. There were no abnormal GI or genitourinary signs. Blood chemistry and urine analysis appeared normal. A gastric aspirate was taken and examined based on a previous study (Chandler, 1938). Follow-up was scheduled to assess response to therapy with albendazole 400 mg single dose. Fecal collection was performed once again for examination, for which the result was negative.

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DISCUSSION

By the morphology and structure of the nematodes, all worms were identified as *D. coronata* using the following special characteristics: annulated cuticle with two pairs of lips in the mouth region; lips that had been entirely transformed into a pair of medial, outwardly acting, distally bifurcate fossores and a pair of lateral lamellae; rhabditoid type of oral cavity; absence of glottoid apparatus, and bursa with 7 pairs of papillae (Fig 2) (Chitwood and Chitwood, 1950; Bird, 1971; Skryabin, 1992). In our specimen, both sexes were found and female nematodes could lay eggs that hatched into the larval stage (Fig 3). Maupas (1900) found about 5 or 6 males per 1,000 worms and the females themselves could develop to maturity. Females contained spermatozoa in uteri in cultures with no males. The worms were described as autogamous protandrous hermaphrodites and males were considered non-functional. This was different from other studies, which stated that mature nematodes were all female (Yokogawa, 1936; Chandler, 1938) and that males were never found in the soil of any suspicious sites of human infection.

In our patient case, female nematodes were only found in rotten tissues of a banana tree near her house, where she used to play with her grandchildren. While the worms are saprophytic, thriving in decaying matter

such as diseased roots of various plants in tropical and subtropical lands, they can also live in soiled parts of the human body, such as the opening of the female urogenital tract; from this site, they may produce potentially life-threatening urinary tract infection. The same nematodes were not found in the soil near our patient's plants, as in previous studies.

The human stomach is usually free from worms due to its acidity. However, *D. coronata* is occasionally recovered from this organ in people whose gastric hydrochloric acid level is abnormally low (Chandler, 1938). Gastric aspiration was performed in our patient,

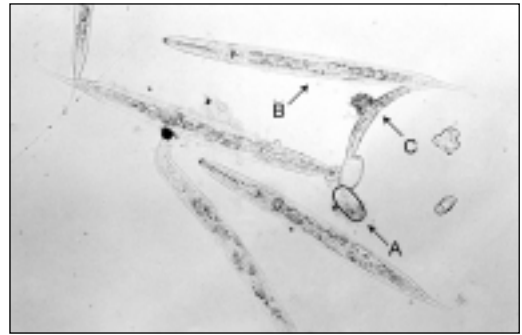


Fig 1- Abundant *Diploscapter coronata* in all stages of development: A-eggs, B-adult egg-bearing females, and C-immature larval form.

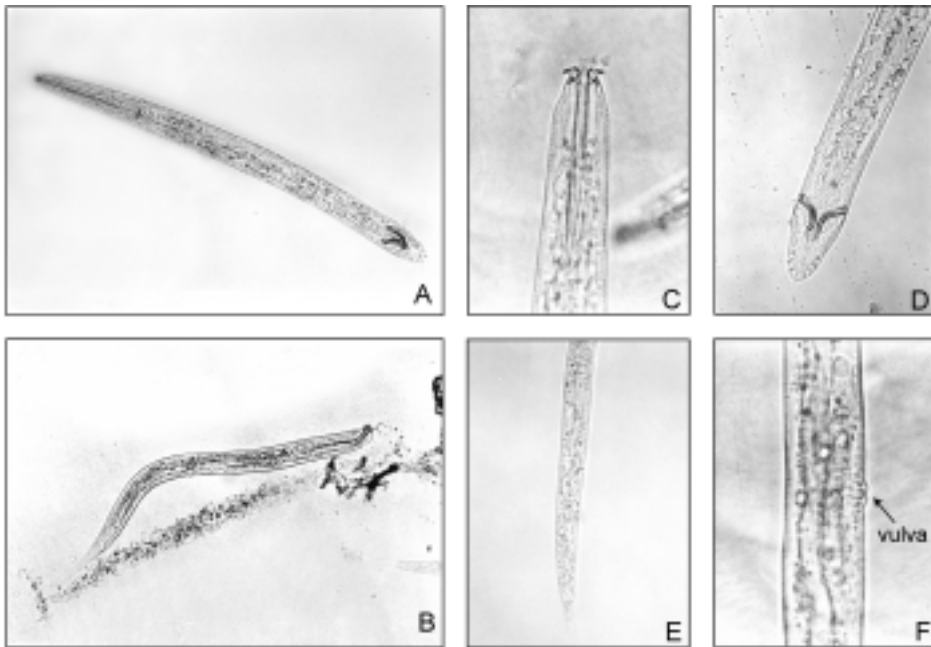


Fig 2- *Diploscapter coronata* adult worms: A-male, B-female, C-mouth part, D-tail of male with spicules and anal region, E-tail of female, F-vulva of female.



Fig 3- Immature larval stage.

but neither worms nor eggs were found, which may have been due to the concentrated acidity of the stomach (pH 5.0 and bicarbonate 0 mmol/l). Contamination of free-living parasites during fecal collection, by soil, implements or flies, could not be ruled out and should be kept in mind, although fecal collection was explained to our patient and strict precautions to prevent contamination were taken (Sandground, 1925).

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#### REFERENCES

Bird AF. The structure of nematodes. New York and London: Academic Press, 1971.

Chandler AC. *Diploscapter coronata* as a facultative parasite of man, with a general review of vertebrate parasitism by rhabditoid worms. *Parasitology* 1938;30:44-55.

Chitwood BG, Chitwood MB. Introduction to nematology. Baltimore: University Park Press, 1950.

Cobb NA. Nematodes, mostly Australian and Fijian. *Macleay Mem Vol, Linn Soc N S W*, 1893:252-308.

Cobb NA. New nematode genera found inhabiting fresh water and non-brackish soils. *J Wash Acad Sci* 1913;3:432-44.

De Man JG. Descriptions of three species of *Anguillulidae* observed in diseased pseudo-bulbs of tropical orchids. *Proc Lpool Biolt Soc* 1895;9:76-94.

Maupas E. [Modes et formes de reproduction des nematodes]. *Arch Zool Exp Gen*, 3<sup>rd</sup> ser. 1900; 8:463-624.

Peters BG. Some nematodes met within a biological investigation of sewage. *J Helminthol* 1930;8:165-84.

Sandground JH. Observation on *Rhabditis hominis* Kobayashi in the United States. *J Parasit* 1925;11:140-8.

Skryabin KI. Key to parasitic nematodes. Vol 4. New Delhi: Amerind Publishing, 1992.

Yokogawa S. A human case of accidental parasitism of *Diploscapter coronata* (Cobb, 1893) Cobb, 1913. *Zoo Mag Tokyo* 1936;48:507-11.

Zimmerman A. [De nematoden der Koffiewortels]. *Meded PI Tuin Batavia* 1898;27:16-41.