

A New Record of the Bithecal Megascolecid Earthworm *Amyntas papilio* (Gates) (Oligochaeta) from Taiwan

台灣一對受精囊之新紀錄種蚯蚓 *Amyntas papilio* (Gates)

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Abstract

This paper reports a new record of the megascolecid earthworm *Amyntas papilio* (Gates, 1930) from Taiwan. It was originally described from Burma, and also reported from the Riukiu Islands of Japan. In our recent earthworm survey in the northern Taiwan, *A. papilio* was collected in the grass fields with rich soil at the campus of National Taiwan University and Hsin-Chu Girl High School. As it occurs at human disturbed habitat associated with urbanization, we suspect it as an exotic species introduced recently from Southeast Asia.

摘要

本文描述一巨蚓科(family Megascolecidae) 台灣新紀錄種蚯蚓*Amyntas papilio* (Gates, 1930)。此種蚯蚓首次在緬甸被記載，同時在日本的琉球群島也有紀錄。在北台灣，我們首次在台灣大學及新竹女中的校園草地中發現，由於它出現在人類活動頻繁的都市棲地中，因此我們推斷該蚯蚓應是由南亞洲遷徙而來。

Key words: earthworm, *Amyntas papilio*, Megascolecidae, new record

關鍵詞: 蚯蚓、蝴蝶遠環蚓、巨蚓科、新紀錄種

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Introduction

Taiwan is an island situated in the subtropical Asia. It has a complex topography, constituting with coastal plains, hills and mountains, of which the latter have elevations of nearly 4,000m. It provides habitats for terrestrial invertebrates in high diversity, such as for butterflies (Emmel and Heppner 1990) and earthworms. However, up to date the earthworm fauna of Taiwan has not been studied in detail; only 24 nominal species were reported prior to 1999 (Goto and Hatai 1898; Kobayashi 1938; Gates 1959; Tsai 1964; Shih *et al.* 1999), and 21 more species of megadrile earthworms since then (Tsai *et al.* 1999; Shen and Tsai 2002; Shen *et al.* 2002; Tsai *et al.* 2000a, 2000b, 2000c, 2002; Chuang and Chen 2003). There was a period of cessation of earthworm investigation in the 1960s to the 1990s (Chen and Shih 1996).

This paper describes a new record of *Amyntas papilio* (Gates, 1930) from Taiwan. This specie was originally described from Burma by Gates (1930), and also reported from the Iriomote Island of Riukiu, Japan by Ohfuchi (1956). In our recent earthworm survey in the northern Taiwan, the specimens of *A. papilio* were collected from the grass fields in the campus of National Taiwan University on 6 May 2000 and of the Hsin-Chu Girl High School on 3 august 2000. The following description is based on two mature specimens fixed with the 10% formalin-water solution and then preserved in the 70% ethyl-alcohol water solution.

Amyntas papilio (Gates, 1930)

Pheretima papilio Gates, 1930. Burma. Rec. Ind. Mus. 32: 316; Ohfuchi, 1956. Iriomote

Island, Riukiu, Japan. J. Agr. Sci. Tokyo Nogyo Daikaku 3(2): 243-261; Gates, 1972. Burma. Trans. Amer. Philo. Soc. 62(7): 205-206.

Amyntas papilio Sims and Easton, 1972. Bio. J. Linn Soc. 4: 169-268.

External characters

Total length 40 and 70 mm, clitellum width 2 mm, segment number 117 and 119. Protomium epilobous. Setae 37-41 in VII, 80 in XX, 6-8 between male pores and 11 in XVII. First dorsal pore in 12/13. Clitellum XIV-XVI, length 2 mm, smooth, setae and dorsal pore absent.

Spermathecal pores one pair in 5/6, ventral, not easily visible, distance between the pores 0.21 body circumference apart. Genital papillae one pair in V, postsetal, anterior to the spermathecal pores, each circular in shape with a slightly convex center. Female pore single, medio-ventral in XIV.

Male pores closely paired ventrally in XVIII, distance between the pores 0.18 body circumference apart. The pore regions with elliptical skin pads like butterfly wings extending from anterior border of XVII to the setal line of XIX. Porophores (papillae with male apertures) located at the posterior end of longitudinal slits of the pads (Fig. 1a).

Preserved specimens white in color with yellowish clitellum.

Internal characters

Septa 5/6/7 thickened, 8/9/10 absent. Gizzard in IX-X, peach-shape, yellowish white in color. Intestine enlarged from XV. Caeca paired in XXVI, extending two segments anteriorly to XXIV, simple, yellowish, wrinkled on the surface (Fig. 1b).

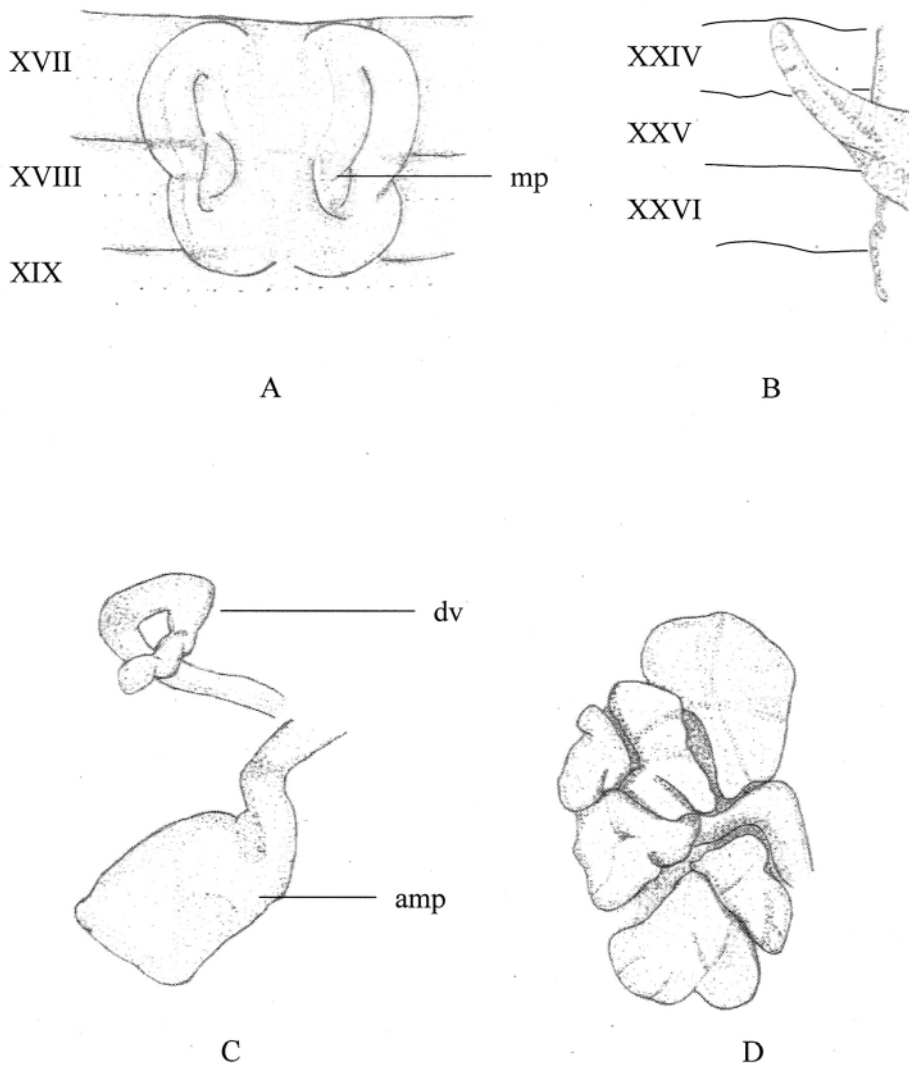


Fig. 1. *Amynthes papilio*: A, male pore region (mp, male opening); B, right caeca; C, left spermathecae (dv, diverticulum; amp, ampulla); D, right prostate gland.

Spermathecae one pair in VI, ampulla oval-shaped, about 1.5 mm long, 0.7 mm wide, and stalk slender, 1.5 mm in length, equivalent to that of ampulla. Diverticulum with a long yellowy striped seminal chamber of 0.7 mm long

and a stalk of about 1.2 mm long (Fig. 1c).

Sperm sac one pair in X, ventral, small, not easily visible. Seminal vesicles two pairs in XI and XII, large, yellowish white, each with a primary ampulla with a cleft of dorsal lobe.

Prostate glands large, in XV-XXI, ducts 2 mm long, L-shaped (Fig. 1d).

Remarks

Amyntas papilio has a single pair of spermathecae in VI and closely ventrally paired male pores with a large elliptical, butterfly-like, skin pads from XVII to XIX. Based on these unique characters, *A. papilio* is easily distinguishable from other megascolecid earthworms in Taiwan.

The characters of *Amyntas papilio*

collected from Taiwan are compared with those described by Gates (1930, 1972) from Burma and those reported by Ohfuchi (1956) from the Riukiu Islands in Table 1. They share similarity in most of the characters. In the original description Gates (1959) mentions that the first dorsal pore of *A. papilio* is in 5/6, but in the review paper of Gates (1972), he corrects it to be in 12/13, similar to the case found in the specimens from Taiwan. Also, *A. papilio* from Burma has a pair of spermathecal pores in 5/6 (Gates 1930, 1972), but that from the Riukiu

Table 1. Comparison of the characters of *Amyntas papilio* collected from Taiwan to those from Burma and Riukiu, Japan

Characters	<i>A. papilio</i>	<i>A. papilio</i> (Gates, 1930)	<i>A. papilio</i> (Gates, 1972)	<i>A. papilio</i> (Ohfuchi, 1956)
Location	Taiwan	Burma	Burma	Riukiu
Body length (mm)	40-70	90	60-138	45-51
Number of segments	117-119	87	87-114	95-123
First dorsal pore	12/13	5/6	12/13	-
Prostomium	Epilobous	Epilobous	Epilobous	-
Setae in VII	37-41	-	-	-
X	80	-	60-80	-
XVII	11	-	18-22	-
XVIII	6-8	-	3-14	7-9
Spermathecal pores	1 pairs (5/6)	1 pairs (5/6)	1 pairs (5/6)	1 pairs (6/7)
Number of spermathecae	1 pairs (VI)	1 pairs (VI)	1 pairs (VI)	1 pairs (VII)
Sperm sac	X, XI	XI, XII	X, XI	X, XI
Seminal vesicle	XI, XII	XI, XII	XI, XII	XI, XII
Prostate	XV-XXI, large	XVII-XXI, large	XVI-XXI, large	-
Intestine origin	XV	XV	XV	-
Genital papillae				
Preclitellar	V	-	-	VI
Postclitellar	-	-	-	-
Caeca paired	XXVI- XXIV	XXVI	XXVII-XXIII	XXVII-XXIV

Islands is in 6/7(Ohfuchi 1956; Kaminhira 1973). Because of the above difference in location of spermathecal pores, Gates (1972) speculates that the specimens of Riukiu (Ohfuchi 1956) may be a different species from *A. papilio* of Burma (Gates 1930). The specimens from Taiwan have the spermathecal pores in 5/6, similar to that from Burma (Gates 1930). As the spermathecal pores are not easily visible externally, Ohfuchi (1956) might err on this character. A further verification on this character for the Riukiu specimens is required to clarify their taxonomic status, whether they are different species from *A. papilio* of Burma as Gates (1972) speculates, or even a new species as we may suspect.

Gates (1932, 1961, 1972) divides *A. papilio* into three subspecies: *A. papilio papilio*, *A. papilio insignis*, and *A. papilio hiulca*. According to the characters of male pores, prostate glands, caeca, and spermathecal pores, the specimens from Taiwan was found to belong to the subspecies *A. papilio papilio*, whose only known locality was Thaton, Burma (Gates 1930). As the Taiwan specimens were collected from the grass fields in the school campus, the human disturbed environments associated with urbanization, we speculate that *A. papilio* is an exotic species introduced recently to Taiwan perhaps with vegetations from the Southeastern Asia.

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