

A New species of the Earthworm Belonging to the Genus
Metaphire Sims and Easton (Megascolecidae:
Oligochaeta) from the Northeastern Taiwan

產於台灣東北部一新種腔環蚓之描述

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Abstract

This paper describes a new species of the earthworm *Metaphire trutina* sp. nov. (Megascolecidae: Oligochaeta) from Hsiaochoachi, Ilan of the northeastern Taiwan. It is a large, sexthecal and holandric earthworm, and has a pair of large, round genital papillae with slightly concave centers on narrow male disc in each of the shallow copulatory chambers in XVIII. It belongs to the *houletti* species-group of the genus *Metaphire* Sims and Easton and closely relates to *Metaphire tschiliensis* (Michaelsen, 1928), *Metaphire viridis* Feng and Ma, 1987, *Metaphire vulgaris* (Chen, 1930), and *Metaphire praepinguis* (Gates, 1935) of China, and *Metaphire aggera* (Kobayashi, 1934) of Korea and Manchuria.

摘要

本文描述產於台灣東北部宜蘭縣小礁溪一新種腔環蚓：*Metaphire trutina* sp. nov.。其為大型蚯蚓，第十八體節的交配腔淺裂，內有一對大而圓的生殖突起。*M. trutina*屬於*Metaphire*屬之*houletti*種群，與產於中國大陸的*Metaphire tschiliensis* (Michaelsen, 1928)、*Metaphire viridis* Feng and Ma, 1987、*Metaphire vulgaris* (Chen, 1930)、*Metaphire praepinguis* (Gates, 1935)以及韓國的*Metaphire aggera* (Kobayashi, 1934)密切相關。

Key words: earthworm, new species, *Metaphire*, Taiwan

關鍵詞： 蚯蚓、新種、腔環蚓屬、台灣

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Introduction

The genus *Metaphire* Sims and Easton is a large group of terrestrial earthworms next to the genus *Amyntas* Kinberg in the family Megascolecidae (Oligochaeta) in Taiwan. They consisted of five endemic species of *Metaphire bununa* Tsai, Tsai and Liaw, 2000, *Metaphire paiwanna* Tsai, Tsai and Liaw, 2000 (Tsai *et al.* 2000a), *Metaphire puyuma* Tsai, Shen and Tsai, 1999 (Tsai *et al.* 1999), *Metaphire yeni* Tsai, Shen and Tsai, 2000 (Tsai *et al.* 2000b), and *Metaphire taiwanensis* Tsai, Tsai and Shen, 2003 (Tsai *et al.* 2003), and four exotic species of *Metaphire californica* (Kinberg, 1867), *Metaphire hesperidum* (Beddard, 1892), *Metaphire posthuma* (Vaillant, 1869), and *Metaphire schmardae* (Horst, 1883) (Tsai *et al.* 2000c). This paper describes a new species *Metaphire trutina* sp. nov. from the northeastern Taiwan. This makes a total of 10 species in the genus *Metaphire* and 50 nominal species of the terrestrial earthworms in Taiwan. The specimens are preserved at Taiwan Endemic Species Research Institute, Chichi, Nantou, Taiwan.

Metaphire trutina sp. nov.

Type material

Holotype: A mature (clitellate) specimen (dissected) collected 18, May 2002 in a ditch along a mountain road from Hsien Rd. 192 at an elevation of around 150m, Hsiaochoochi, Ilan County, Taiwan by Y. H. Chen (cat. no. 14-03884).

Paratype: An immature (aclitellate) specimen (dissected), same collection of holotype (cat. no. 14-03882).

External characters

Length 236 mm for holotype and 305 mm for paratype. Clitellum length 7.89 mm and clitellum width 11.0 mm. Prostomium prolobous. Segment number 96 for holotype and 151 for paratype. Heavy annulets (secondary segmentation) 3 per segment in VI-IX and 5 in X-XIII, setal annulet slightly wider than the adjacent annulets. Setae numerous, 109-118 in VII, 108-128 in XX and 22-28 between male pores. First dorsal pore in 12/13. Clitellum XIV-XVI, dorsal pores absent, setae absent in XIV and XV, but 5 setae on medio-ventrum of XVI.

Spermathecal pores invisible externally due to heavy secondary segmentation, 3 pairs, ventro-lateral in 6/7-8/9, but detected from inside after dissection. No genital papillae in the spermathecal region. Female pore single, medio-ventral in XIV.

Male pores paired in XVIII, ventro-lateral,

large, C-shape, 2.87 mm in longitudinal length, reaching 17/18 and 18/19 segmental furrows. Porophore, a small tubercle with a small male aperture at the latero-central end of male disc, a narrow longitudinal ridge extending from setal annulet of XVIII. No setae on the male disc. A pair of large, nearly equally sized round-shaped genital papillae located on anterior and posterior ends of the male disc (Fig. 1A, B). Each of the genital papillae 1.0 to 1.1 mm in diameter with a slightly concave center. Lateral wall of the

copulatory chamber smooth externally (laterally) but slightly folliculated internally (medially).

Preserved specimens purplish blue dorsum and around clitellum, and brownish gray ventrum. Setal annulet lighter in color as compared to adjacent annulets.

Internal characters

Septa 8/9/10 absent, 10/11-13/14 very thick. Gizzard large, round in IX and X. Intestine enlarged from XIV. Intestinal caeca paired in

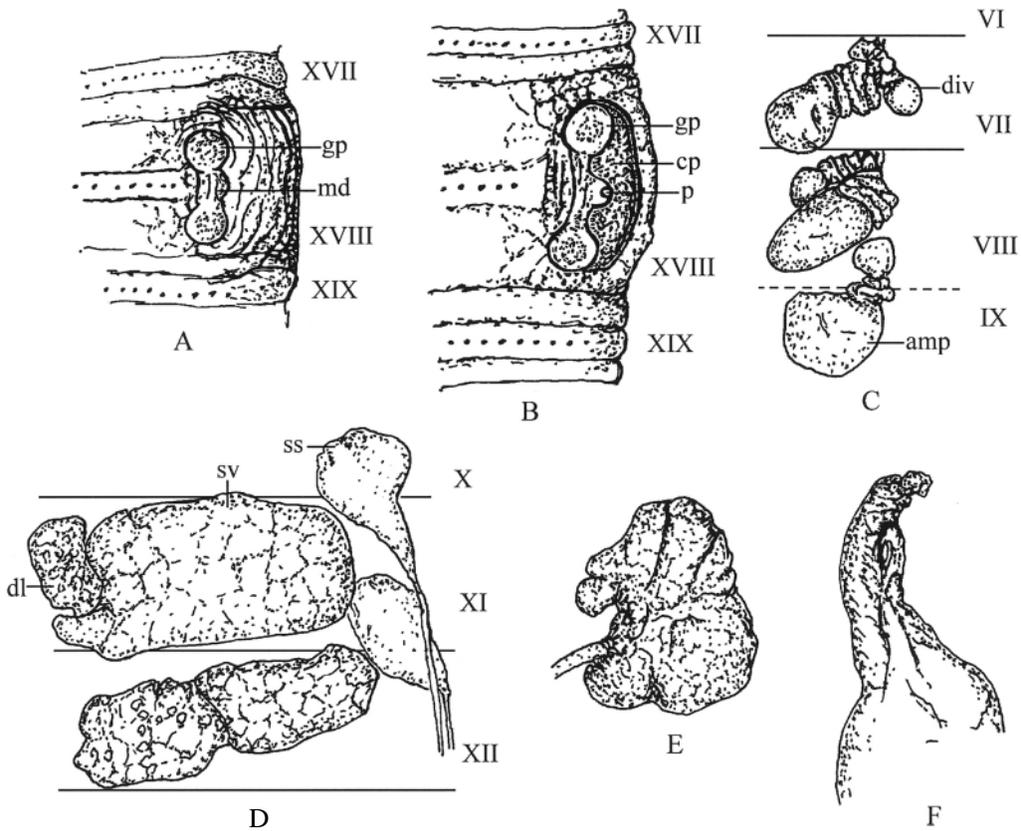


Fig. 1. *Metaphire trutina* sp. nov. holotype: (A) ventral view of left male pore region with copulatory chamber closed (gp, genital papilla; md, male disc), (B) ventral view of left male pore region with copulatory chamber (cp) opened (p, porophore), (C) right spermathecae (amp, ampulla; div, diverticulum), (D) right sperm sacs (ss) and seminal vesicles (sv) (dl, dorsal lobe), (E) right prostate gland, and (F) right caecum.

XXVII extending anteriorly to XXII, each simple with a pointed end, surface wrinkled with vertical lines (Fig. 1F). Esophageal hearts enlarged in XI-XIII.

Spermathecae three pairs in VII-IX, each with an oval or round ampulla with heavily pressed wrinkles at proximal end, and a very short stout stalk. Diverticulum with silver colored and oval shaped seminal chamber and a heavily twisted stalk (Fig. 1C). Ovaries paired in XIII.

Sperm sacs two pairs, medio-ventral in X and XI, each round, white in color, with smooth surface, sperm ducts connected in XIII. Seminal vesicles, two pairs in XI and XII. Anterior pair large, pale in color, surface wrinkled, each with a round brownish, granulated dorsal lobe, filled whole segmental cavity. Posterior pair smaller in size as compared to the anterior ones, granulated surface, each with a large, brown colored, granulated dorsal lobe (Fig. 1D).

Prostate glands paired in XVIII, each lobed, surface folliculated, prostatic duct stout and straight (Fig. 1E). No accessory gland or visible structure associated with the genital papillae in copulatory chambers.

Locality and habitat

The type specimens were collected from the roadside ditch covered with about 10 cm thick sand without vegetation.

Etymology

The name *trutina* is given to this species with reference to an earthworm possessing a pair of large genital papillae, each with a slightly concave center and connected by narrow male disc with porophore at medio-lateral center, like a balance, in each shallow copulatory chamber.

Remarks

Metaphire trutina sp. nov. is sixthelical with spermathecal pores in 6/7/8/9, and has no genital papillae in 17/18 and 18/19. It belongs to the *houletti* species-group of the genus *Metaphire* (Sims and Easton 1972). It is a large earthworm with a pair of shallow copulatory chambers with C-shaped opening, the characters closely related to *Metaphire vulgaris* (Chen, 1930) of Nanking, China, *Metaphire viridis* Feng and Ma, 1987 from Gansu of the northwest China, *Metaphire praepinguis* (Gates, 1935) of Szichuan (Gates 1935, 1939), *Metaphire aggera* (Kobayashi, 1934) of Korea and Manchuria (Kobayashi 1934, 1940), and *Metaphire tschiliensis* (Michaelsen, 1928) of China. The last species consists of three subspecies: 1) *M. t. tschiliensis* (Michaelsen, 1928) of North and Central China (= *Pheretima kiangsuensis* Chen, 1930 (Chen 1930, 1931, 1933)), 2) *M. t. grahami* (Gates, 1935) from Szichuan (Gates 1935, 1939), and 3) *M. t. kokoana* (Chen and Fong, 1975) of Qinghai and Gansu (Chen *et al.* 1975).

Metaphire trutina is easily distinguished from the above related species and subspecies of China by possessing higher number of setae, absence of preclitellar genital papillae, absence of wrinkled, swollen lips or crescent ridges bordered anteriorly and posteriorly to each of the spermathecal pores, and the presence of two large genital papillae on both anterior and posterior ends of male disc in each shallow copulatory chamber (Table 1).

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Table 1. A comparison of characters among *Metaphire trutina* sp. nov., *M. tschiliensis*, *M. praepinguis*, *M. vulgaris*, *M. viridis*, and *M. aggera*

Character	<i>M. trutina</i> sp. nov.	<i>M. tschiliensis</i> (Michaelsen, 1928)	<i>M. praepinguis</i> (Gates, 1939)	<i>M. vulgaris</i> (Chen, 1930)	<i>M. viridis</i> Feng and Ma, 1987	<i>M. aggera</i> (Kobayashi, 1934)
Locality	Taiwan	Hopei, China	Szechwan, China	Kiangsu, China	Gansu, China	Korea
Body length (mm)	236-305	190-210	207	120-215	192-230	144-185
Segment number	106-137	200	-	90-124	124-128	152-161
First dorsal pore	12/13	11/12	12/13	11/12 or 12/13	12/13	12/13 or 13/14
Setal number						
V	-	50	-	44-58 (III)	49-54	46-60
VII	109-118	-	23?	60-75 (VIII)	64-67	52-56
XIII	-	72	-	-	-	68-70
XIV (clitellum)	0	sparse on ventrum	setal pits	setal pits	0	0
XV (clitellum)	0	sparse on ventrum	setal pits	setal pits	0	0
XVI (clitellum)	5	sparse on ventrum	setal pits	setal pits	0	0
XX	108-128	-	93	-	-	70-74
XXV	-	76	-	60-75	92-95	69-72
between male pores	22-28	-	9(+4?)	12-22	22-34	18-19
Spermathecal pores	6/7-8/9	6/7-8/9	6/7-8/9	6/7-8/9	6/7-8/9	6/7-8/9
crested ridges	Absent	Present	Present	Present (wrinkled, swollen lips)	Present	-
Genital papillae						
preclitellar	Absent	Present on VIII-IX ^a	Paired presetal on VII-IX	2 papillae in spermathecal chamber	Paired on VII-IX	Absent or paired on VII-IX
postclitellar	Absent	Absent	Absent	Absent	Absent	Absent
Copulatory chamber	C-shape	C-shape	C-shape	C-shape	C-shape	C-shape
genital papillae	2, large	1-4	1, large	3, large	4	3-4
Spermathecae	VII, VIII, IX stalk short, stout	VII, VIII, IX stalk stout	VII, VIII, IX stalk stout	VII, VIII, IX stalk stout	VII, VIII, IX stalk stout	VII, VIII, IX stalk short, stout
Diverticulum	Round seminal chamber with tightly twisted stalk	Slender, coiled	Wide seminal chamber with smooth stalk	Slender, coiled	Slender, coiled	Coiled
Intestine enlarged	XIV	XIV	XV or XVI	XV	XV	XV
Prostate glands	XVI-XVIII	XVII-XIX	Small in XVIII	Large, XVII-XXI or XVI-XXII	XV-XX or XVII-XIX	1/2XVIII-1/2XIX
Accessory gland	Absent	-	Glandular mass with bundled stalks associated with spermathecal stalks and prostatic ducts	Sessile	Paired glandular mass in X	Absent or round, inconspicuous

^aBased on the specimen (USNM No. 20142) examined.

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