

## Earthworms from Mt. Sopaik, Korea

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소백산 陸樓貧毛類의 分類學的 研究

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### 摘 要

著者들은 1968, 1971 및 1972년의 3個年間 소백산에서 採集한 지렁이 총 1,850個體를 調査 整理한 결과 *Pheretima agrestis*, *Ph. gucheonensis*, *Ph. hilgendorfi*, *Ph. jiriensis*, *Ph. koreana*, *Ph. soulensis* 및 *Ph. susakii patina*의 7가지종과 신종 *Ph. planta*와 *Ph. sapaikensis*등 총 1屬 9種을 얻었다.

신종 *Ph. planta*는 체장 105mm., 체폭 5.5mm., 체절수 101개이며, spermathecal pore 2쌍으로서 vi체절과 vii체절 腹面 setal line바로 위에 位置한다. 또 male pore region의 양모에 있어서 뚜렷한 特徵을 나타내고 있다. 신종 *Ph. sapaikensis*는 가지종인 *Ph. koreana* 다음으로 많은 수가 채집되었으며 체장 80mm., 체폭 4.5mm., 체절수 82개이며 spermathecal pore는 2쌍으로서 5/6, 6/7에 位置한다. 특히 xviii체절 male pore사이에 쌍을 이 불규칙적인 모양의 genital patches는 본종의 특징이다.

### INTRODUCTION

This note reports the results of a study of the first earthworms that have been collected on Mt. Sopaik, which is located in a boundary between Kyungsang-pook-do and Chungcheong-pook-do, during the summers of 1968, 1971 and 1972.

The materials obtained comprise 1850 specimens which belong to genus *Pheretima*, including nine species. Among these, two species are new to science.

Type specimens are preserved in a collection of Kyungpook National University.

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## Description

**Fam.** *Megascolecidae*

**Gen.** *Pheretima* Kinberg, 1867

*Pheretima planta* n. sp. (Figs. 1-9)

Korean name: Baljagukmuni·Jileungi(발자국무늬지렁이)

*External characteristics:* Length 105-120mm., diameter 4.5-6mm., segments 78-98. Prostomium epilobous. First dorsal pore in 12/13. These are also distinct on clitellum. Color in formalin; light brown dorsally, blueish grey ventrally, and clitellum is yellowish grey.

Clitellum entire in xiv-xvi, without setae. Setae begins on II, approximate setal number are as follows: 54/III, 62/V, 67/VIII, 66/XII and 60/XX. Between spermathecal pore setae are 3~7(VI) and 1~3(VII).

Female pore, on xiv midventrally. Spermathecal pores, two pairs, situated in vi and vii, presetal just close to the setal line about 1/3 of the circumference ventrally apart; each pore on a small circular papillae. In this region below the each pore, there are a lot of fine longitudinal indentation which formed like a folded band. These band like folds were probably formed secondarily. No genital papillae around this region.

Male pores, present in setal circle of xviii, the most of ventrolaterally. Each pore situated the narrow end of male disc which formed sole-shaped transversely with distinct boundaries. Ventrally, around the male pore region, intersegmental furrows 17/18 and 18/19 are unrecognizable and formed characteristic genital area which is slightly glandulated. Around the male disc there are distinct boundaries which are glandulated, whitened and slightly depressed bands. These boundaries would appear somewhat quadrangle including sole-shaped male disc. Between the male pores setae are usually absent, but sometimes present one or two setae.

*Internal anatomy:* Septa; 5/6~7/8, 10/11~14/15 are slightly thickened, and 8/9 and 9/10 absent. Gizzard, globular in shape. Intestine begins to swell in xv. Intestinal caeca originating in xxvii, extending anteriorly in xxiii, simple, fingershaped. Both ventral and dorsal margins are slightly serrated. Typhlosole begins in region of caecal segment and is unrecognizable behind seventh-third segment.

Hearts, four pairs in x-xiii, but the first pair sometimes asymmetrical, small in calibre. Paired lymph glands found along the dorsal vessel from caecal segment posteriorly.

Seminal vesicles enormously developed, two pairs in xi and xii. Anterior pair completely fused each other and covered the dorsal vessel completely. Posterior one is slightly smaller than the former and is not fused medially. Testis sacs in x and xi, moderate in size, anterior pair thick V-shaped, each sac elongated and rounded and rounded anteriorly. Posterior pair partly under anterior one, in xi, broadly united medially and much smaller than the former.

Prostates are well developed in xvi, xxi~xxi, xxi. Each glandular portion consists of two or three main lobes, and each lobe is divided into small pieces. Prostatic duct is looped in a U-shape. Ectal limb is thicker than ental limb.

Spermathecae, two pairs in vi and vii, more ventrally; its opening is presetal just close to the setal line of parietal. Ampulla is voluminous, round sac-like, or elongated oval shaped. Its surface is slightly plicated. Duct of ampulla originated from parietal short common duct with diverticulum. It is not distinctly marked off from the ampulla, and is shorter than the latter in length. Diverticulum is longer than the main portion, its ectal half is slender duct and the ental half is much coiled, slightly dilated. Iridescence is distinct at the ental portion.

*Specimens examined:* Holotype; Mt. Sopaik, (1 clitellate specimen, 28-viii-1972, J. D. Son), Paratypes; Mt. Sopaik, (12 clitellate specimens, 19~23-viii-1968, Y. Her; 8 clitellate specimens, 28-viii-1972, J. D. Son)

*Diagnosis:* The present species is easily distinguished from the other known species of the genus in the form of male pore region and by the location of spermathecal pore.

*Pheretima sapaikensis* n. sp. (Figs. 10-26)

Korean name: Sopaiksan-Jileungi(소백산지렁이)

*External characteristics:* Length, 68-102mm., diameter 4-5mm., segments 60-85. Prostomium epilobous. First dorsal pore in 12/13. Those on clitellum usually obliterated. Color in formalin; reddish brown dorsally, blueish brown ventrally and clitellum is dark brown. Clitellum entire, in xiv-xvi, highly glandulated without setae and other markings.

Setae beginning on II, evenly distributed all over body. No marked differences in size between the preclitellar and postclitellar. Their numbers; 50~52/III, 48~53/V, 48~56/VIII, 50~53/XII, 54~56/XX, and between spermathecal pore setae are 21~23(V), similar number on either VI and VII; 4~12 between male pores.

Female pore, on xiv midventrally. Spermathecal pores, minute, two pairs, on the anterior margins of vi and vii close to 5/6 and 6/7, about 1/3 of the circumference ventrolaterally. No genital papillae in this region.

Male pores present on ventrolateral extremities of xviii, in a setal line, about 1/3 of body circumference apart. Each pore found in a slightly depressed, somewhat bean-shaped area with distinct boundaries which is surrounded by several incomplete circumferential furrows. Medially to the each pore on male segment, there are paired genital patches which is roughly silk worm's cocoon in shape, but it has many variations in shape as is shown in figures 11-19.

Cocoon shaped patches with its surrounding skin are always raised. Between them 4 to 12 setae are planted.

*Internal anatomy:* Septa; 8/9, 9/10 absent, and no septa especially thickened. Gizzard small, round, globula in shape, in viii and ix. Intestine beginning to swell in xv. Intestinal caeca, simple, fingershaped and originated in xxvii, extending anteriorly xxiv. Septal constriction distinct. Typhlosle is a low simple lamella, begins in region of xxii and is unrecognizable behind thirty-seventh segment.

Heart of x on left side, asymmetrical. Hearts of xi-xiii are normal, but in general small calibre. Paired lymph glands found behind caecal segment along the dorsal vessel, but behind septum 36/37 more distinct.

Testis sacs in x and xi, large and conspicuous; anterior pair connected medially with its opposite fellow, usually in a thick U-shape; posterior pair broadly connected or completely fused into transverse sac. Seminal vesicles, two pairs in xi and xii, well developed, and distinct dorsal lobe. Nearly equal one to another in size. Pseudovesicles still smaller, one pair, and present in xiii. Prostates well developed in xvi, xvii~xix, xx. Both of glandular portion consist of three to four main lobes, each lobe divided into leaflets. Prostatic duct is long, looped in a U-shape. Thicker at distal half than the ental part. Medially to prostatic duct pairs of genital marking glands are sessile on the parietes in xviii, which is associated with external genital patches.

Spermathecae two pairs in vi and vii. Each ampulla is a pouch in shape, voluminous and is slightly wrinkled. Duct of ampulla and diverticulum are divided from common duct. Duct of ampulla is thicker and almost same to the latter in length. Diverticulum composing of a long slender duct with muscular sheen and ental dilated portion which is much coiled. Iridescence is recognizable at the ental portion. Diverticulum is much longer than the main portion.

*Specimens examined:* Holotype; Mt. Sopaik, (1 clitellate specimen, 28-viii-1972, J. D. Son), Paratype; Mt. Sopaik, (321 clitellate specimens, 19~23-viii-1968, Y. Her; 173 clitellate specimens, 26~28-viii-1972, J. D. Son & B. J. Son)

*Diagnosis:* This new species is readily separated from other species by the shape of male pore segment which includes paired genital patches.

*Pheretima agrestis* (Goto et Hatai, 1899)

Korean name: Batt-Jileungi(밭지렁이)

*Specimens examined*: Mt. Sopaik, (53 clitellate specimens 19~23-viii-1968, Y. Her; 106 clitellate specimens, 26~28-viii-1972, J.D.Son & B.J.Son)

*Distribution*: Korea, Japan, America

***Pheretima gucheonensis*** Song et Paik, 1970

Korean name: Gucheon-Jileungi(구천지렁이)

*Specimens examined*: Mt. Sopaik, ( 51 clitellate specimens, 19~23-viii-1968, Y. Her; 1 clitellate specimen, 22-viii-1971, J. K. Park; 6 clitellate specimens, 26~28-viii-1972, J. D. Son, B. J. Son & M. K. Park)

*Distribution*: Korea

***Pheretima hilgendorfi*** (Michaelson, 1892)

Korean: Oemuni-Jileungi(외무늬 지렁이)

*Specimens examined*: Mt. Sopaik, ( 30 clitellate specimens, 19~23-viii-1968, Y. Her; 32 clitellate specimens 22-viii-1971, J.K. Park; 118 clitellate specimens, 26~28-viii-1972, J.D. Son & M.K. Park)

*Distribution*: Korea, Japan, America

***Pheretima jiriensis*** Song et Paik, 1971

Korean name: Jirisan-Jileungi(지리산지렁이)

*Specimens examined*: Mt. Sopaik, (6 clitellate specimens, 19~23-viii-1968, Y. Her; 1 clitellate specimen, 22-viii-1971, J. K. Park; 3 clitellate specimens, 26~28-vii-1972, J. D. Son & M. K. Park)

*Distribution*: Korea

***Pheretima koreana*** Kobayashi, 1938

Korean name: Cham-Jileungi(참지렁이)

*Specimens examined*: Mt. Sopaik, (67 clitellate specimens, 19~23-viii-1968, Y. Her; 753 clitellate specimens, 26~28-viii-1972, J. D. Son, B. J. Son & M. K. Park)

*Distribution*: Korea

***Pheretima soulensis*** Kobayashi, 1938

Korean name: Seoul-Jileungi(서울지렁이)

*Specimens examined*: Mt. Sopaik, (61 clitellate specimens, 19~23-viii-1968, Y. Her; 10 clitellate specimens, 22-viii-1971, J. K. Park; 33 clitellate specimens, 26~28-viii-1972, J. D. Son, B. J. Son & M. K. Park)

*Distribution*: Korea

***Pheretima susakii patina*** Kobayashi, 1936

Korean name: Aekoma-Jileungi(애꼬마지렁이)

*Specimens examined*: Mt. Sopaik, (1 clitellate specimen, 19-viii-1968, Y. Her; 1

clitellate specimen, 22-viii-1971, J. K. Park; 1 clitellate specimen, 27-viii-1972, M. K. Park)

*Distribution:* Korea

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### Explantion of Figures

#### *Pheretima planta* n. sp.

1. Ventral view of the anterior portion of the body.
2. Ventral aspect of segments xvii-xix.
3. Ventral aspect of segments vi and viii, with spermathecal pore (Left).
4. Right spermathecae (vi and vii).
5. Same.
6. Prostate gland.
7. Dorsal view of seminal vesicles.
8. Ventral view of anterior male organ.
9. Intestinal caecum (Left).

#### *Pheretima sapaikensis* n. sp.

10. Ventral view of the anterior portion of the body.
11. Ventral aspect of male pore region, with paired genital patches.

12~19. Same.

20. Prostate glands, with GM gland.

21. GM glands of xviii segment.

22. Ventral view of anterior male organ.

23. Dorsal view of seminal vesicles.

24. Intestinal caecum (Left).

25. Right spermathecae (vi).

26. Same (vii).



