Preliminary Survey of the Earthworms from Dagelet Isl., Korea

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울릉도產 陸棲貧毛類의 分類學的 硏究

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摘 要

韓國產 陸棲貧毛類의 分類學的 硏究의 일련으로서 1965年~1966年 및 1968年에 採集된 울릉도產을 調査한 結果 3科 5屬 10種(*Allolobophora caliginosa trapezoides, Eisenia foetida, Pheretima agrestis, Ph. heteropoda, Ph. hilgendorfi, Ph. hupeiensis, Ph. phaselus, Ph. serrata, Ph. sp.* 1, *Ph. sp.* 2)을 報告하였다. 울릉도의 陸棲貧毛類에 관해서는 지금까지 報告된 바 없으므로 이들은 全部 울릉도 未記錄이 되고 이중 *Pheretima heteropoda* Goto et Hatai는 韓國 未記錄種이고 *Pheretima hilgendorfi*는 male pore를 가진 點이 本土產과 比較해서 若干 特異하였다.

INTRODUCTION

Up to the present, no research work has been done on the earthworm in Dagelet Isl. Therefore, the authors made a research on it with the materials which were collected and sent from 1965 to 1966, by Mr. Yong Ki Kim, teacher of Woolreung Fisheries High School and in 1968 by Mr. Yeon Heo, student of Teachers College, Kyungpook National University.

As a result of the investigation, the authors found out one hundred and eighty one specimens which belonged to two families, three genera and ten species.

However, we imagine that more species can be found by further research.

The authors wish to express the deepest appreciation to Dr. Prof. G.E. Gates, Maine University of the United States who offered many worthy references with encouragement throughout this work. Also it is a pleasure to record here deep gratitude to Mr. Yong Ki Kim and Mr. Yeon Heo who made this study successful by collecting and sending all the available materials.

DESCRIPTION

Fam. *Lumbricidae*

Gen. ***Allolobophora*** **Eisen et Rosa**

Allolobophora caliginosa trapezoides

(Anton Duges, 1828)

Korean name: Galsaeginagsi-Jileungi(갈색낙시지렁이)

Lumbricus trapezoides Anton Duges, 1828, Ann. Sci. Nat., XV, p. 289.

Allolobophora caliginosa trapezoides: Chen, 1931, p. 168, 1933, pp. 216-217; Kobayashi, 1935, p. 130 1938(b), p. 6, 1939(a), p. 751, 1939(b), p. 738, 1940(a), p. 180, 1941 pp. 150-151.

The length ranging from 100 mm. to 270 mm., diameter 3.5-5 mm., number of segments 95-137. Clitellum saddle-shaped, glandular layer thicker on dorsal and lateral sides, less on ventral side, commonly in XXVI-XXXIV or XXVII-XXXIV. Puberty-wall (glandular ridge) present on each side of ventro-lateral side of XXX-XXXII or XXXIII, each ridge continuous, but interrupted in intersegmental furrow only in young specimens.

Locality: Dagelet Isl.(32 clitellate specimens, V 3 1968, Y.K. Kim)

Korean Records : Hamkyung-pookdo: Seong-jin; Ha-

mkyungnamdo: Bug-cheong, Yeong-heung, Won-san, Deog-won, Hong-won; Pyungan-pookdo: Jeong-iu, Cheol-san; Pyungan-namdo: Sun-cheon, Jang-lim; Whanghae-do: Bag-cheon, An-ag, Yeon-an, Geom-cheon, Sari-won, Jereong; Kangwon-do: Go-jeo, Hong-seong, Cheol-won, Jumun-jin, Mun-mag, Shingo-san, Gang-reung, Won-ju; Kyungki-do: Mun-san, An-seong, Su-won, I-cheon, Gang-wha, Ryeon-cheon, Pyung-taeg, Gunpho-jang, Byeongjeom, Seoul; Chungcheong-namdo: Tae-jeon, Rye-san, Seong-kwan; Jeonla-pookdo: Jeon-ju, Gun-san, Keum-je, I-ri, Keum-san, Nam-won; Jeonla-namdo: Mock-pho, Sun-cheon, Ryeo-su, Song-jeongri, Hae-nam, Jin-do, Dam-yang; Kyungsang-pookdo: Mun-kyung, Kim-cheon, Taegu; Kyungsanga-namdo: Gu-pho, Hyeop-cheon, Jin-ju.

Distribution: Korea, China, Japan, India, Central Asia, Europe, South America, North America, Australia.

Fam. ***Lumbricidae***

Gen. ***Eisenia*** **Malm et Michaelsen**

Eisenia foetida **(Savigny, 1826)**

Korean name: Jul-jileungi(줄지렁이)

Eisenia foetida: Kobayashi, 1938(b), pp. 6-18, 1938(d), p. 738, 1939(a), p. 751, 1940(a), p. 180, 1941, p. 148; Ohfuchi, 1950, p. 146, fig. No. 13.

The length ranging from 55 mm. to 130 mm., diameter 3-4 mm., number of segments 76-110. Prostomium epilobous. Setae distance aa=bc, dd=1/2 circumference. First dorsal pore in 4/5. Clitellum, the segment 24, 25, 26-32=7-9. Puberty wall present on each side of ventro-lateral side of 1/2, 28, 28-30 or 31 segments. Spermathecal pores, two pairs in 9/10, 10/11 intersegmental furrow, which situated both sides of near the dorsal pore.

Seminal vesicles, four pairs in IX-XII, of which IX and X smaller than the other, even the 1st pair very small or rudimentary. The other in XI, XII, largest with distinct dorsal lobe. Septa in general thickened, 6/7, 7/8, 8/9, 10/11, 11/12, and 12/13 very much thickened.

Locality: Dagelet Isl.(16 clitellate specimens, V 3, 1956, Y. K. Kim; 7 clitellate specimens, VII 21, 1968, Y. Heo).

Korean Record: Hamkyung-pookdo: Cheong-jin, Kyeong-seong; Hamkyung-namdo: Bug-cheong, Yeong-heung, Deog-won, Won-san; Pyungan-pookdo: Cho-san; Pyungan-namdo: Sun-cheon, Jin-nampho; Whanghae-do: Sari-won, Hae-ju, Bag-cheon; Kyungki-do: Seoul, Gae-seong; Kangwon-do: Se-pho, Keumwha, Jumun-jin, Cheol-won; Chungcheong-pookdo: Goe-san; Jeonla-pookdo: Jeon-ju, I-ri, Keum-san; Jeonla-namdo: Song-jeongri, Mock-pho; Kyungsang-pookdo: Kim-cheon, Taegu.

Distribution: Korea, China, Russia, Japan, India, Central Asia, Europe, North America, South America, Australia, Egypt, Philippines.

Fam. ***Megascolecidae***

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

Pheretima agrestis(Goto et Hatai, 1899)

(Figs. 1, 8 & 9)

Korean name: Batt-Jileungi(밭지렁이)

Perichaeta agrestis Goto and Hatai, 1899, Ann. Zool. Jap., III. p. 17.

Pheretima agrestis: Hatai, 1930, pp. 651-655; Kobayashi, 1935, p. 128, 1938(a), p. 520, 1939(a), p. 751; Gates, 1958, pp. 1-3; Ohfuchi, 1957, p. 1360, fig. No. 3350.

The length ranging from 100 mm., to 155 mm., diameter 5-7 mm., number of segments 71-109. Prostomium epilobous. First dorsal pore in 12/13. Light brown patches present ventrally in VII, which is paired or unipaired regions where the epidermis is thin and slightly wrinkled and also this portion no septa. Male pores, always absent, sometimes presetal of XVIII and just close it posterior border to the XVII, nearly circular and large genital papillae placed. It is very rare. Spermathecal pores, three pairs in 5/6, 6/7 and 7/8.

Locality: Dagelet Isl.(23 clitellate specimens, VIII 5, 1956, Y.K. Kim; 36 clitellate specimens, VII 22, 1968, Heo)

Korean Record: Hamkyung-namdo: Won-san, Ham-heung; Pyungan-namdo: Jin-nampho; Kyungki-do: Seoul, Yong-in, An-seong, Byeong-jeum; Kangwon-do: Se-pho; Chungcheong-namdo: Tae-jeon, Asan; Jeonla-pookdo: Jeon-ju, Gun-san; Jeonla-namdo: Ryeo-su, Mock-pho; Kyung-namdo: Pusan, Wul-san.

Distribution: Korea, Japan, America (Albany, Baltimore, Boston, New York)

Pheretima heteropoda **Goto et Hatai, 1898**

(Figs. 2, 10, 11, 12 & 21)

Korean name: Byeoniseong-Jileungi(변성이지렁이)

Perichaeta heteropoda Goto et Hatai, 1898, p. 69.
Pheretima heteropoda: Ohfuchi, 1957, p. 1363, fig. No. 3857.

External characteristics: The length ranging from 80 mm. to 180 mm., average length 127 mm., diameter 3-5 mm., number of segments 69-112. Prostomium epliobous. First dorsal pore in general 11/12, sometimes 10/11, but indistinct. Color in formalin, dorsally light brown, ventrally pale brown, clitellum reddish brown. Setae present from II. Setal number as follows: 32/III, 35/V, 41/VIII, 42/XII, 48/XX, 10(V), 10(VI), 12(VII), 13(VIII) between the spermathecal pore setae, male pore setae 14. Male pores situated ventro-laterally on the setal line of XVIII, about 1/3 of the circumference ventrally apart. Each male disc slightly protuberant, the line of demarcation is nearly circular with several incomplete furrows. On the center slightly depressed and a small whitish circular papillae situated. Spermathecal pores, four pairs, in 5/6-8/9 intersegmental furrow, about 1/3 of the circumference ventrally apart, each pore is transversely slit-like, on the center slightly depressed with small circular papillae. On the VII-IX segments, there are three pairs of genital papillae, which situated anteriorly to the setal line of each segment, nearly circular, on the center slightly depressed, between two papillae 4-6 setae, and on each side between male pore and genital papillae about 2-3 setae.

Internal anatomy: Septa, in general, very thinned, 5/6, 6/7, 7/8 thickened, 10/11, 11/12, 12/13 and 13/14 slightly thickened, 8/9, 9/10 absent.

Gizzard, bell-shaped elongated, moderate in size. Intestine begins in XVI just behind 15/16. Intestinal caeca originating in XXVII, simple, finger shaped, extending anteriorly as far as XXIV.

Hearts, four pairs, in X-XIII, the first pair small in calibre, and the rest somewhat thick, or even very large in calibre in some cases. Paired lymph glands, found behind septum 15/16 backward.

Seminal vesicles, two pairs in XI, XII, very small in size. Ovaries, very large, adhere to the preseptum of XIII. Prostates, very characteristic, glandular portion consists of several small glands. Prostatic duct is indistinct, but short and slender crescent shaped loop with slightly muscular sheen. In mainland specimens, prostates absent, but both sides present only prostatic duct, which is nearly very small half ring-shaped loop.

Spermathecae, four pairs, in VI, VII, VIII & IX, each ampulla somewhat triangular or strawberry shaped, on surface smooth but sometimes slightly wrinkled. The spermathecal duct is thick, nearly equal or slightly shorter than the ampulla, shinning on surface, distinctly marked off from the ampulla. Diverticulum longer than the main portion, its ectal half slender but thick walled, simply coiled. Its ental half forming a oval seminal chamber. But some specimens, its part not swollen to form seminal chamber, and slender blind end. Inner side of near the spermathecae, there are small whitish accessory glands found, which are ocrresponding to the external genital papillae.

Present species has many abnormal specimens in spermathecae, its main portion and diverticulum like a bunch of grapes(fig. 11).

Locality: Dagelet Isl.(2 clitellate specimens, VII 22, 1968, Y. Heo).

Distribution: Japan, Taiwan.

***Pheretima hilgendorfi*(Michaelsen, 1892)**
(Figs. 3, 13, 14 & 28)

Korean name: Han-munni-Jileungi (한무늬지렁이)

Perichaeta hilgendorfi Michaelsen, 1892, Arch. Naturg, BD. 58, p. 235. t. 13. f. 15.
Pheretima hilgendorfi: Hatai, 1930, pp. 651-659; Yamaguchi, 1930, pp. 89-95; Kobayshi, 1934, pp. 1-11, 1935, p. 128, 1936(a), pp. 42-51, 1936(c), p. 146, 1937, pp. 473-485, 1938(c), pp. 90-170, 1939(a), p. 751; Gates, 1958, pp .11-16; Ohfuchi, 1957, p. 1356, fig. No. 3838.

The length ranging from 90 mm. to 210 mm., average length 140-150 mm., diameter 6-7 mm., number of segments 90-120. Prostomium epilobous. First dorsal pore in 12/13. Spermathecal pores two pairs in 6/7, 7/8 intersegmental furrow. Presetal patches of genital markings are found in VIII, IX and similar patches are also often found on XVIII.

Lots of specimens from many districts of mainland seldom had male pore. However, twenty two out of twenty three specimens from Daglet Isl., evidently had both male pore and prostate gland.

Further researches are required on more specimens of Dagelet Isl.

Table 1. Comparison of the presence or absence of the male pore between Dagelet Isl. and mainland in *Pheretima hilgendorfi*.

Locality	Total number of specimens	Male pore present	Male pore absent
Dagelet Isl.	23	22	1
Mainland (many districts)	267	42	225

Locality: Dagelet Isl.(18 clitellate and 1 aclitellate specimens, VIII 5, 1966, Y.K. Kim; 4 clitellate VII 19, 1968, Y. Heo)

Korean Record: Hamkyung-namdo: Won-san, Deog-won, Yeong-heung; Pyungan-namdo: Jin-nampho; Whanghae-do: Sin-gye; Kangwon-do: Go-jeo, Se-pho, Cheol-won, Sam-cheok; Kyungki-do: Pho-cheon, Seoul, Gang-wha, Mun-san, Yeon-cheon, Yong-in, Yang-ju, An-seong, Kwang-reung, Chungcheong-pookdo: Cheong-ju, Asan, Tae-jeon; Chung-cheong-namdo: Seo-san; Jeonla-pookdo: Jeon-ju, Gun-san; Kyungsang-pookdo: Mun-kyung, Kim-cheon; Kyungsang-namdo: Gupho, Pusan, Dong-re, Wulsan.

Distribution: Japan, Korea, America.

***Pheretima hupeiensis*(Michaelsen, 1895)**

(Figs. 4, 15, 16 & 17)

Korean name: Ddong-Jileungi (똥지렁이)

Pheretima hupeiensis: Chen, 1933, pp. 251-255, 1935, p. 121, 1936, p. 271; Kobayashi, 1938(b), p. 7, 1938 (c), pp. 152-153, 1938(d), p. 738, 1939(b), p. 778, 1940(b), p. 120.

The length ranging from 72-130 mm., diameter 4-4.5 mm., number or segments 91-123. Prostomium prolobous. First dorsal pore in 11/12. Spermathecal pores, three pairs in 6/7, 7/8 and 8/9 intersegmental furrow, it situated ventrally, closer than the male pores, about 1/8 of the circumference ventrally apart. Septa, 5/6, 6/7, 7/8 very much thickened, 8/9, 9/10, 10/11, 11/12, 12/13, 13/14 slightly thickened, the rest in general thinned.

Locality: Dagelet Isl.(34 clitellate and 14 aclitellate specimens, VIII 6, 1966, Y. K. Kim, 1 clitellate, VII 21, 1968, Y. Heo).

Korean Record: Hamkyung-pookdo: Jang-jin; Ham-kyung-namdo: Bug-cheong, Ham-heung, Won-san, Deog-won; Phyungan-pookdo: Sini-ju, Jeong-ju, Mt. Myoh-yung; Phyungan-namdo: Sinan-ju, Jang-rim, Pyung-yang, Jin-nampho; Whanghae-do: Sari-won, Hae-ju; Kwang-won-do: Keum-wha, Hong-seong, Ju-munjin, Mun-mag, Chun-cheon; Kyungki-do: Seoul, Gae-seong, Yong-in, Su-won, Byeong-jeum, Ryeon-cheon, Munsan, Pyungt-aeg, Gunpho-jang; Chungcheong-pookdo: Cheong-ju, Goe-san; Chungcheong-namdo: Asan, Rye-san, Tae-jeon, Jochi-won; Jeonla-pookdo: Keum-san, Keum-je, Nam-won, I-ri, Jeon-ju; Jeonla-namdo: Mock-pho, Sun-cheon, Jin-do; Kyungsang-pookdo: Kim-cheon, Mun-kyung, Ta-egu, An-dong, Pho-hang; Kyungsang-namdo: Pusan, Hyeop-cheon.

Distribution: Korea, China, Japan, North America.

***Pheretima phaselus* Hatai, 1930**

(Figs. 5, 18, 19 & 20)

Korean name: Hismure-Jileungi (히스무레지렁이)

Pheretime phaselus Hatai, 1930, pp. 659-661, fig. 6; Kobayashi, 1938(c), p. 146, 1939(a), p. 751; Ohfuchi, 1957, p. 1361, fig. No. 3852.

Length 100 mm., diameter 5.5-6 mm., number of segments 109. First dorsal pore in 12/13. Prostomium epilobous. Male pores situated ventrally on the setal line of XVIII, about 1/4 of the circumference ventrally apart. Each male disc represented somewhat quadrangle or bean shaped with longitudinal slit which is found along its medium line. The slit is outwardly curved in the middle.

Spermathecal pores, three pairs in 5/6, 6/7 and 7/8 intersegmental furrow, interval between the each pore is same that of male pore, about 1/4 of the circumerence ventrally apart. Septa, in general thinned, 5/6, 6/7, 7/8, 10/11, 11/12 and 12/13 slightly thickened, 8/9, 9/10, absent. Paired lymph glands founds along the dorsal vessel behind caecal segment caudalwards.

Locality: Dagelet Isl.(1 clitellate specimens, VII 31, 1968, Y. Heo).

Korean Record: Seoul

Distribution: Korea, China

***Pheretima serrata* Kobayashi, 1936**

(Figs. 6, 22, 23, 24, 25, 26 & 27)

Korean name: Topni-Wangjileungi (톱니 왕지렁이)

Pheretima serrata Kobayashi, 1936(c), pp. 165-168.

The length 105-110 mm., diameter 5.5-6 mm., number of segments 109-110. Prostomium epilobous. Secondary annulations developed on segments anterior to clitellum and slightly developed on segments posterior near to clitellum. The segments anterior to the clitellum and that of end of the body much bigger, of which setal rings slightly elevated ridges. The setal rings, anteclitellar setae enlarged, especially distinct on III-IX.

First dorsal pore in 12/13. Spermathecal pores, three pairs in 5/6, 6/7 and 7/8 intersegmental furrow, about 2/6 of the circumference ventrally apart.

Septa 5/6, 6/7, 7/8 thickened, 8/9 ventrally traceable, 9/10 absent, 10/11, 11/12, 12/13 very much thickened, 13/14 slightly thickened, the succeeding septa thin and membraneous. Paired lymph glands found behind caecal segment caudalwards along the dorsal vessel.

Locality: Dagelet Isl.(2 clitellate specimens, VIII 5, 1966, Y.K. Kim)

Korean Record: Kwangreung

Distribution: Korea

Pheretima sp. 1.

(Figs. 29, 30, 31 & 32)

External characteristics: The length ranging from 157 to 220 mm., greatest diameter 7-10 mm., number of segments 107-134. Prostomium epilobous. Color in formalin, dark reddish brown dorsally, white yellowish grey ventrally, clitellum reddish brown.

First dorsal pore in 12/13. Clitellum entire in 14-16, without setae. Setae beginning on II, very large. Approximately setal number as follows: 20/III, 29/V, 35/VIII, 53/XII, 64/XX, 10(VI), 11(VII), 13(VIII) between spermathecal pore setae, male pore setae 13. Male pores situated ventro-laterally on the setal line of XVIII, about 1/3 of the circumference ventrally apart. Its most part similar to *Pheretima monstrifera*. Female pore, single, midventrally on XIV. Spermathecal pores, four pairs, posteriorly located on V, VI, VII and VIII quite close to the intersegmental furrows, about 1/3 of the circumference apart.

Internal anatomy: Septa 5/6, 6/7, 7/8, 10/11, 11/12 very much thickened, 12/13, 13/14 moderately thickened, 8/9, 9/10 absent.

Gizzard moderate to the body size, globular or bell-shaped. Intestine begins to swell in XV(XVI). Intestinal caeca, simple, finger shaped, originating in XXVII, extending anteriorly into XXII-XXIII, with septal constriction distinct.

Hearts, four pairs in X-XIII. Paired lymph glands very large, found along dorsal vessel behind XV segment caudalwards. Seminal vesicles, two pairs in XI and XII, small, subequal in size. Ovaries, very large, usual in position. Prostates, well developed, in XVII-XIX, consisting of 2-3 main lobes, each lobe is divided by many indentations. Prostatic duct is rather thick with marked muscular sheen, bent into am O-shaped loop, sometimes, hair-pin shaped. Spermathecae, four pairs in VI, VII, VIII and IX. Ampullae elongated, somewhat red-pepper shaped but 4 th broader than the rest, and on surface slightly wrinkled. Duct shorter than the ampulla about 3 : 1 in length, distinctly marked off from the ampulla. Diverticulum much shorter than the main portion, about 2 : 1 in length. Its ectal half slender but sometimes slightly coiled, the ental half swollen to form seminal chamber which is like a dumbell or small oval shaped.

The present species may be related to *Pheretima monstrifera* but it differs from the latter in some important characters. They are as follows:

	Ph. sp. 1	*Ph. monstrifera*
1.	Lymph gland found along the dorsal vessel behind XV segment caudalwards.	Absent
2.	On dorsal margin of intestinal caeca appendage absent.	The dorsal margin with several light colored indistinct appendages.
3.	Prostate gland relatively large.	Small
4.	Spermathecal pores, four pairs, posteriorly located on V, VI, VII and VIII quite close to the intersegmental furrow.	Anteriorly located on VI, VII, VIII and IX.

Locality: Dagelet Isl.(5 clitellate specimens, V 11, 1966, Y. K. Kim).

Pheretima sp. 2.

(Figs. 7, 33, 34, 35 & 36)

External characteristics: The length ranging from 105 mm. to 115 mm., diameter 5-6 mm., number of segments 98-102. Prostomium combined pro and

epilobous. Color in formalin, dark brown dorsally, pale blue ventrally, clitellum yellowish brown. First dorsal pore in 12/13. Clitellum entire in 14-16, without setae.

Setae present from II, very small and delicate, setal number as follows: 37/III, 43/V, 54/VIII, 55/XIII, 54/XX, male pore setae 8-11.

Male pores, absent, but it has a pair of genital patches ventro-laterally on the setal line of XVIII, and are slightly protubrant, nearly circular shaped. On its surface placed a number of small papillae which are nearly circular and at the center of each papillae depressed with small whitish spot.

Female pore is median. Spermathecal pores absent.

Internal anatomy: Septa, in general very thinned, no septa especially thickened, 10/11, 11/12, 12/13 slightly thickened, 8/9, 9/10 absent. Gizzard, globular in shape. Intestine begins to swell in XV. Intestinal caeca, originating in XXVII, extending anteriorly into about XXIII, complicated, each consisting of six or eight finger shaped secondary caeca, of which the dorsal-most is the largest, the more vertral ones become gradually smaller.

Hearts, four pairs, but sometimes, first pair asymmetry, on right side rudimentary, or absent. The first lymph gland is in XVI, and rudimentary anterior to XXVII, but behind the caecal segment well developed.

Seminal vesicles, two pairs in XI and XII, well developed, large in size, somewhat quadrangle shaped. First pair very larger than the second pair. Ovaries,small in size, irregular in shape, each strins the egg, usual in position. Prostates also absent, but a number of from eight to eleven of GM glands found in various arrangements and in segments XVII-XIX(fig. 34. These correspond to the external small papillae on genital patches.

This GM glands formerly called capsulogenous glands, perhaps by some Japanese (in the hilgendorfi), but the assumption involved in that name is incorrect. Spermathecae lacking.

Locality: Dagelet Isl.(20 clitellate specimens, VII 22, 1968, Y. Heo).

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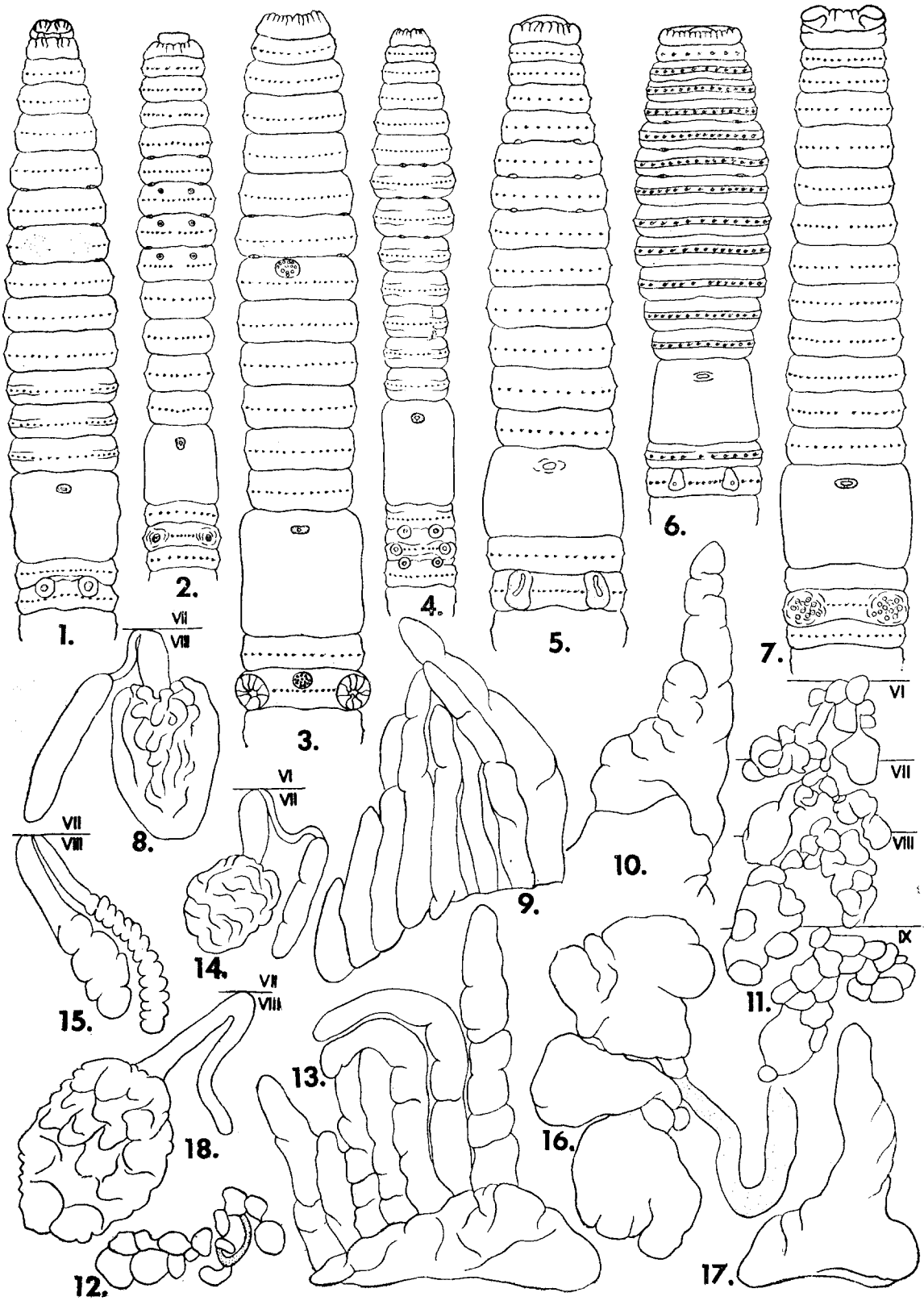
Explanation of Figures

1. *Pheretima agrestis*, Ventral view of the anterior portion of the body
2. *Ph. heteropoda*, ditto
3. *Ph. hilgendorfi*, ditto
4. *Ph. hupeiensis*, ditto
5. *Ph. phaselus*, ditto
6. *Ph. serrata*, ditto
7. *Ph. sp.* 2, ditto
8. *Ph. agrestis*, Spermathecae (left)
9. Same, Intestinal caecum (left)
10. *Ph. heteropoea*, Intestinal caecum (right)
11. Same, Spermathecae (abnormal type)
12. Same, Prostate gland (abnormal type)
13. *Ph. hilgendorfi*, Intestinal caecum (right)
14. Same, Spermathecae (right)
15. *Ph. hupeiensis*, Spermathecae (right)
16. Same, Prostate gland (left)
17. Same, Intestinal caecum (left)
18. *Ph. phaselus*, Spermathecae (left)
19. Same, Prostate gland (left)
20. Same, Intestinal caecum (right)
21. *Ph. heteropoda*, Female pore
22. *Ph. serrata*, Spermathecae (left)
23. Same, Spermathecae (left)
24. Same, Spermathecae (left)
25. Same, Prostate gland (left)
26. Same, Male pore (right)
27. *Pheretima serrata*, Intestinal caecum (left)
28. *Ph. hilgendorfi*, Prostate gland and GM glands (right)
29. *Ph. sp.* 1., Male pore (left)
30. Same, Spermathecal pore (left)
31. Same, Prostate gland (left)
32. Same, Intestinal caecum (left)
33. *Ph. sp.* 2., Seminal vesicle (right, dorsal view)
34. Same, GM glands (left)
35. Same, Genital patch (right)
36. Same, Intestinal caecum (left)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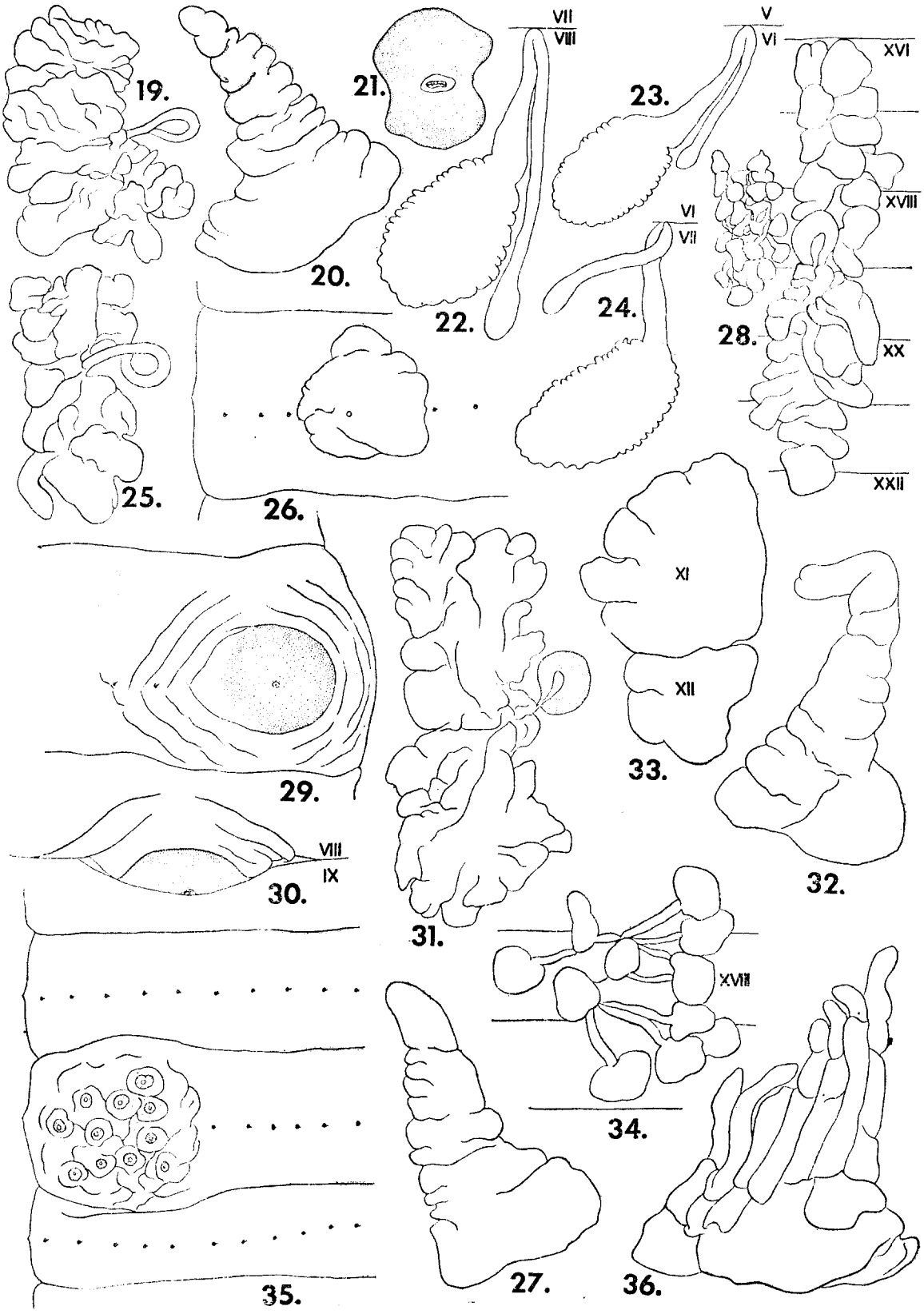
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