

Five New Earthworms of the Genus *Amyntas* Kinberg (Megascolecidae) with Four Pairs of Spermathecae

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Yong Hong and Samuel W. James (2001) Five new earthworms of the genus *Amyntas* Kinberg (Megascolecidae) with four pairs of spermathecae. *Zoological Studies* 40(4): 269-275. Unlike other Korean *Amyntas*, these 5 new species have 4 pairs of spermathecal pores. Five new species of the genus *Amyntas* are described from material collected in Korea: *A. youngtai* sp. nov., *A. kimhaeiensis* sp. nov., *A. sangyeoli* sp. nov., *A. sinsiensis* sp. nov., and *A. baemsagolensis* sp. nov. They also differ from other *Amyntas* in their patterns of genital markings and the appearance of the male pore region. Descriptions of the new species are provided, including illustrations of the ventral view and spermathecae. <http://www.sinica.edu.tw/zool/zoolstud/40.4/269.pdf>

Key words: Taxonomy, Oligochaeta, Megascolecidae, *Amyntas*, Korea.

In the genus *Amyntas*, the shape of the male pore region and the locations and numbers of genital markings near spermathecal pores are useful characters for the discrimination of species. However, using only external characters for species recognition is unreliable because individuals of species are variable. The present 5 species with 4 pairs of spermathecae are especially variable. These 5 new species have no iridescence on the male funnels or in the spermathecal diverticula. This suggests that the 5 worms are male-sterile. Gates (1972) said that male sterility is often found with high variability in external sexual characters.

Song and Paik (1969) recorded *Pheretima* sp. 1 from Dagelet I., and separated *Pheretima* sp. 1 from *A. monstifera* (Kobayashi 1936), by means of lymph glands, prostate shape, locations of spermathecal pores, and genital markings. Song (1966) also gave an account of *Pheretima* sp. 6, a different species from *A. monstifera*. In this paper, based on Song's specimens and other recent specimens (Hong and James 2001), these 2 previously noticed but unnamed species are described, along with 3 more. *Pheretima* sp. 1 and *Pheretima* sp. 6 are here

named, *A. baemsagolensis* sp. nov. and *A. youngtai* sp. nov., respectively. There are relatively few *Amyntas* with 4 pairs of spermathecae, compared to the number of species with 2 pairs. These octothecal species also have large body size and big spermathecal pores. Few individuals of each species were collected, whereas other species collected at the same locations were more abundant. The type material is deposited at the Korean Institute for Biodiversity Research (KIBIO), Jeonbuk National University.

SYSTEMATIC ACCOUNTS

Amyntas youngtai Hong and James sp. nov. (Fig. 1A-C)

Description: Dimensions 165-190 by 7.5-7.8 mm at segment x, 6.4-8.0 mm at xxx, 6.3-7.2 mm at clitellum; body cylindrical throughout, segments 110-123. Setae regularly distributed around segmental equators, numbering 39 at vii, 64 at xx; 16-17 between male pores, setae ii-ix larger than those on

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other segments; setal formula AA:AB:YZ:ZZ = 5.5:5:3:3.5 at xiii. Female pore single in xiv, 0.3 mm, round. Prostomium epilobic, with tongue open. Brownish dorsally and light brownish ventrally, clitellum chocolate colored, formalin preservation. First dorsal pore 12/13. Clitellum annular xiv-xvi; setae and dorsal pores not visible externally within clitellum.

Male pores at lateral margins of ventrum in xviii, centered in male patches, slightly protuberant on 0.6-0.8-mm diameter circular porophores on setal lines, with furrows around lateral margin. Paired genital papillae 0.3-0.5 mm, dark, circular, posterior to male patches within porophores. Spermathecal pores in 5/6-8/9 on 1/2-round porophores with straight edges forming intersegmental furrows, rounded edges on posterior faces of v-viii. Genital markings paired, pre-setal, median to spermathecal pore line in ix, sometimes 1 marking absent.

Septa 5/6-7/8 thick, muscular, 8/9 very thin, 9/10 absent, 10/11-13/14 thick, muscular. Gizzard large in viii. Intestine beginning from xv, large paired digitate lymph glands from xv. Typhlosole developed from xxvii. Intestinal caeca simple, originating from xxvii, extending anteriorly to about xxiv, a large finger-shaped sac. Hearts xi-xiii esophageal, ix lateral. Male sexual system holandric, testes and funnels in paired sacs in x, xi; sacs not enclosing other organs, sperm ducts muscular. Seminal vesicles small, two pairs in xi, xii with dorsal appendages; pseudovesicles paired in xiii, xiv. Prostates xviii small within xvii-xix; short, thick U-shaped ducts, both glandular portions consisting of 2 main lobes, each lobe divided into leaflets. Genital papillae of xviii with large sessile glands corresponding to the externally visible spots.

Ovaries in xiii. Four pairs of spermathecae in vi-ix; each ampulla small, ovate to mitten-shaped with some furrows, ducts thick; diverticula stalks muscular, slightly longer than ducts, shorter than ampulla, chamber club-shaped; no nephridia on spermathecal ducts. Genital marking on glands sessile. Spermathecal porophores with sessile glands.

Type materials: Holotype and 2 paratypes: Korea, Jeju-do, Mt. Halla, Gwaneumsa, 6 Aug. 1969 (YT An).

Materials examined: 3 clitellate, Jeju-do, Mt. Halla, Gwaneumsa, 6 Aug. 1969 (YT An); 1 clitellate, 2 acitellate, Jeju-do, Ala-dong, 5 Aug. 1969 (YT An); 1 clitellate, Jeju-do, Jeju-shi, 25 July 1966 (JH Kim); 1 clitellate, Daegu-shi, Kyungpook, Natl. Univ., 17 Sept. 1971 (HO Kim); 1 clitellate, 1 acitellate, Gyung-sangbuk-do, Gumpo Elementary School, 4

Sept. 1968 (MJ Song); 2 clitellate, Gyung-sangbuk-do, Kimhae-shi, 15 Aug. 1969 (HY Chang).

Etymology: The species is named for its type collector.

Remarks: The species is similar to *A. monstifera*, but differs from it by the shape of the male pore region and the genital markings. Also the present species is close to *A. baemsagolensis* sp. nov., but *A. baemsagolensis* sp. nov. has no genital papillae on the male pore region. *A. youngtai* sp. nov. is *Pheretima* sp. 6 in Song (1966).

***Amyntas kimhaeiensis* Hong and James sp. nov.**
(Fig. 2A-C)

Description: Dimensions 140-193 by 6.4-7.0 mm at segment x, 5.6-6.3 mm at xxx, 5.7-6.7 mm at

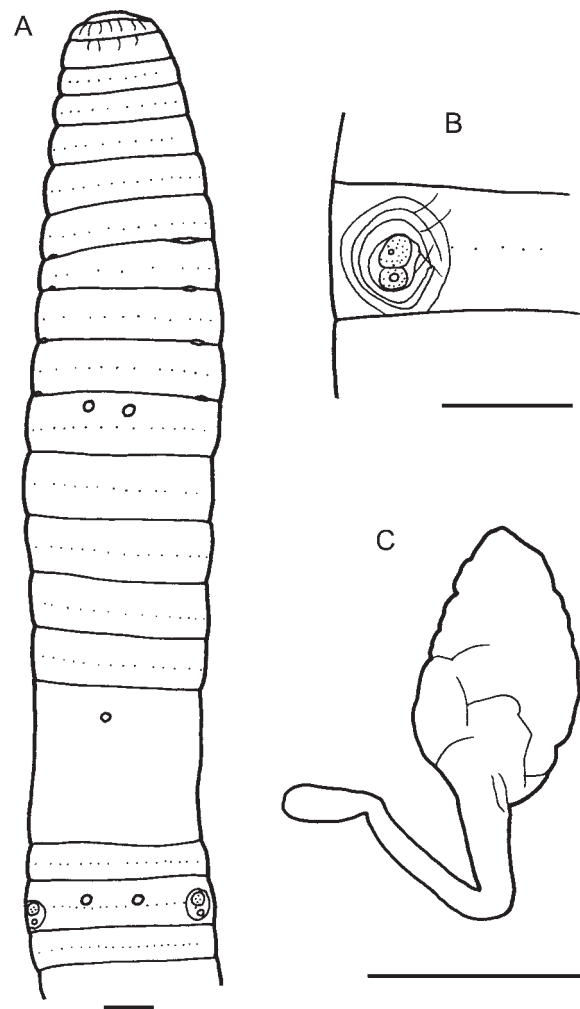


Fig. 1. *Amyntas youngtai* sp. nov.: A, ventral view; B, male pore region in xviii; C, spermathecae and diverticulum. Scale bars = 2 mm.

clitellum; body cylindrical throughout, segments 99-135. Setae regularly distributed around segmental equators, numbering 35 at vii, 55 at xx; 16-17 between male pores, setae ii-ix larger than those of other segments; setal formula AA:AB:YZ:ZZ = 5.5:3.5:3:5 at xiii. Female pore single in xiv, 0.3 mm, round. Prostomium epilobic, with tongue open. Brownish dorsally and yellowish ventrally, clitellum chocolate colored, formalin preservation. First dorsal pore 11/12, inconspicuous. Clitellum annular xiv-xvi; setae and dorsal pores not visible externally within clitellum.

Male pores at lateral margins of ventrum in xviii, centered in male patches, slightly protuberant on 0.6-0.7-mm diameter circular porophores on setal lines, with furrows around lateral margin. Paired genital papillae 0.3-0.4 mm, dark circular, adjacent to male patches, median to male pores, post-setal. Spermathecal pores in 5/6-8/9 on 1/2-round porophores with straight edges forming intersegmental furrows, rounded edges on anterior faces of vi-ix. Genital markings paired, post-setal, near spermathecal pores in viii.

Septa 5/6-7/8 thick, muscular, 8/9 very thin, 9/10 absent, 10/11-13/14 thick, muscular. Gizzard large in viii. Intestine beginning from xv, large paired digitate lymph glands from xv. Typhlosole developed from xxvii. Intestinal caeca simple, originating from xxvii, extending anteriorly to about xxiv, a large finger-shaped sac. Hearts xi-xiii esophageal, ix lateral. Male sexual system holandric, testes and funnels in paired sacs in x, xi. Seminal vesicles small, two pairs in xi, xii with dorsal appendages; pseudo-vesicles paired in xiii, xiv. Prostates xviii small within xvii-xix; short, thick U-shaped ducts, both glandular portions consisting of 2 main lobes, each lobe divided into leaflets. Genital papillae of xviii with sessile glands corresponding to the externally visible spots.

Ovaries in xiii. Four pairs of spermathecae in vi-ix; each ampulla small strawberry-shaped, ducts thick; diverticula stalks muscular, as long as or slightly longer than ducts, chamber egg-shaped; no nephridia on spermathecal ducts. Genital marking on glands sessile, present at spermathecal porophores also.

Type material: Holotype: Korea, Gyung-sangbuk-do, Kimhae-shi, 15 Aug. 1969 (HY Chang).

Materials examined: 1 clitellate, Gyung-sangbuk-do, Ullung-gun, Dagelet I., 5 Aug. 1966 (YK Kim); 1 clitellate, Chungchongbuk-do, Chungju-shi, 10 Sept. 1966 (G Nam).

Etymology: The species is named for its type locality.

Remarks: The species is similar to *A. youngtai* sp. nov., but differs by the shape of the male pore region and the genital markings, and spermathecal porophores are anterior on vi-ix, rather than posterior on v-viii. The species has no genital markings median and pre-setal to male pores.

***Amyntas sangyeoli* Hong and James sp. nov.**

(Fig. 3A-C)

Description: Dimensions 165-186 by 6.7-7.2 mm at segment x, 5.5-7.0 mm at xxx, 5.7-6.8 mm at clitellum; body cylindrical throughout, segments 118-126. Setae regularly distributed around segmental equators, numbering 35 at vii, 50 at xx; 18-21 between male pores, setae ii-ix larger than those of other segments; setal formula AA:AB:YZ:ZZ = 3.5:3:2:5 at xiii. Female pore single in xiv, 0.4 mm, round.

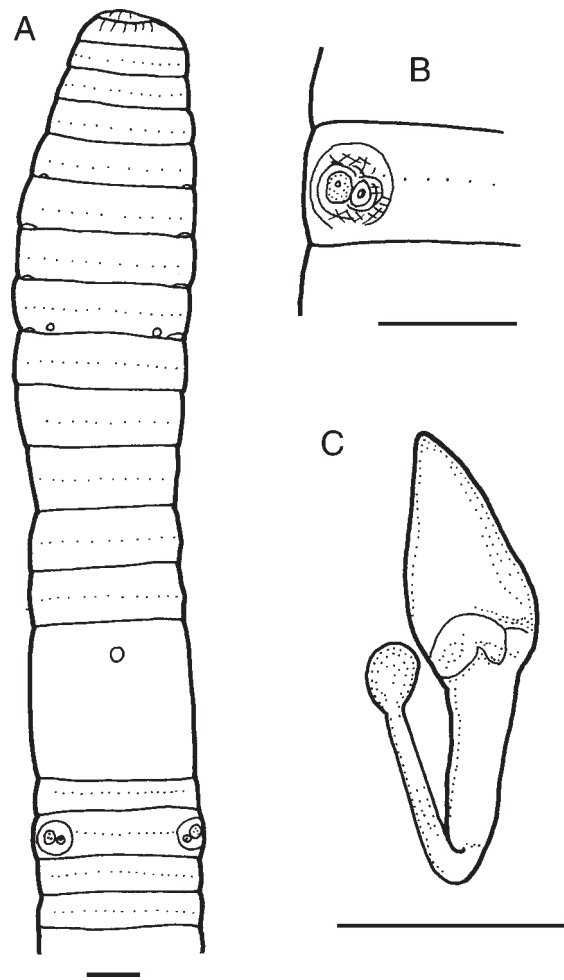


Fig. 2. *Amyntas kimhaeiensis* sp. nov.: A, ventral view; B, male pore region in xviii; C, spermathecae and diverticulum. Scale bars = 2 mm.

Prostomium epilobic, with tongue open. Brownish dorsally and yellowish ventrally, clitellum red, formalin preservation. First dorsal pore 12/13, inconspicuous. Clitellum annular xiv-xvi; setae and dorsal pores not visible externally within clitellum.

Male pores at lateral margins of ventrum in xviii, centered in male patches slightly protuberant on about 0.8-mm-diameter circular porophores on setal lines. Paired genital papillae elevated, sucker-like, 0.5-mm dark concentric circles, one pair post-setal, just median to male patches, one pair pre-setal, median to male pores separated by 4-5 setal intervals. Spermathecal pores in 5/6-8/9 on nearly circular porophores similar to genital markings, posterior edges of porophores forming intersegmental furrows, rounded edges on posterior faces of v-viii. Genital markings paired, pre-setal, median to spermathecal pore line in viii, ix.

Septa 5/6-7/8 thick, muscular, 8/9, 9/10 absent, 10/11-13/14 thick, muscular. Gizzard large in viii-x. Intestine beginning from xv; large paired digitate lymph glands from xv. Typhlosole developed from xxvii. Intestinal caeca simple, originating from xxvii, extending anteriorly to about xxiv, a large finger-shaped sac. Hearts xi-xiii esophageal, ix lateral. Male sexual system holandric, testes and funnels in paired sacs in x, xi. Seminal vesicles small, two pairs in xi, xii with dorsal appendages; pseudo-vesicles paired in xiii, xiv. Prostates xviii large within xvi-xx; short, thick U-shaped ducts, both glandular portions consisting of 2 or 3 main lobes, each lobe divided into leaflets. Genital papillae of xviii with sessile glands corresponding to the externally visible spots.

Ovaries in xiii. Four pairs of spermathecae in vi-ix; each ampulla small ovate to mitten-shaped, ducts moderately thick; diverticula stalks muscular, longer than ducts, slender, chamber elongate fusiform; no nephridia on spermathecal ducts. Genital marking on glands sessile, markings also present on spermathecal porophore.

Type materials: Holotype and 1 paratype: Korea, Gyung-sangbuk-do, Youngil-gun, Gigy, 19 July 1966 (SY Lee).

Materials examined: 2 clitellate, 1 acitellate, Gyung-sangbuk-do, Sindang-dong, 10 July 1971 (MJ Song).

Etymology: The species is named for its type collector.

Remarks: The species is similar to *A. kimhaeiensis* sp. nov., but differs from it by the shape of the male pore region and the genital markings. *A. sangyeoli* sp. nov. has 2 pairs of genital papillae, one median and pre-setal, and one post-setal and me-

dian to the male pores. *A. sangyeoli* sp. nov. lacks septum 8/9, unlike *A. kimhaeiensis* sp. nov.

***Amyntas sinsiensis* Hong and James sp. nov.**
(Fig. 4A-C)

Description: Dimensions 165-195 by 7.0 mm at segment x, 7.7 mm at xxx, 7.1 mm at clitellum; body cylindrical throughout, segments 112-138. Setae regularly distributed around segmental equators, numbering 34 at vii, 53 at xx; 12 between male pores, setae ii-ix larger than those of other segments, segmental equators iv-ix elevated ridges; setal formula AA:AB:YZ:ZZ = 6:5:3:5 at xiii. Female pore single in xiv, 0.5 mm, round or oval. Prostomium epilobic, with tongue open. Light dark brownish dorsally and yellowish ventrally, clitellum coffee colored, formalin preservation. First dorsal pore 12/13. Clitellum annular xiv-xvi; setae and dorsal pores not visible, externally.

Male pores at lateral margins of ventrum in xviii, male patches invaginated on 1.3-mm-diameter

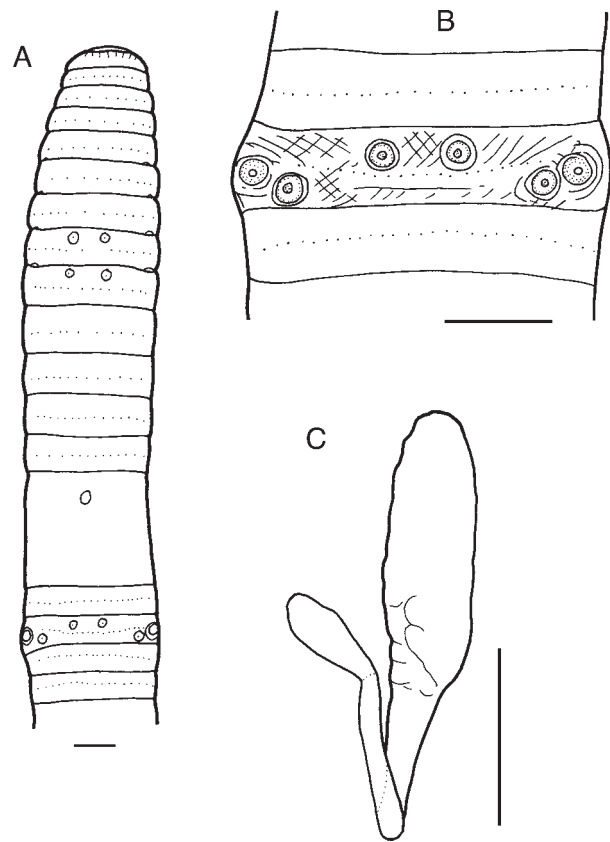


Fig. 3. *Amyntas sangyeoli* sp. nov.: A, ventral view; B, male pore region in xviii; C, spermathecae and diverticulum. Scale bars = 2 mm.

domed circular porophores, with furrows around lateral margin resembling ears; grooves like stairs above medial margin. Spermathecal pores in 5/6-8/9 on 1/2-round porophores with straight edges forming intersegmental furrows, rounded edges on posterior faces of v-viii. Genital markings medial to spermathecal pores viii, ix; one pair pre-setal in viii, one post-setal pair in viii, one pre-setal pair in ix, 0.8-mm discs, post-setal pair in viii missing in 1 individual; one pair post-setal in viii missing in 1 individual.

Septa 5/6-7/8 thick, 8/9 very thin, 9/10 absent, 10/11,11/12 thick, 12/13, 13/14 thin with some muscle. Gizzard large in viii. Intestine beginning from xv; much mucus in gut contents; one large pair of lymph glands from xv. Typhlosole well-developed from xxvii. Intestinal caeca simple, originating from xxvii, extending anteriorly to about xxiii, a large finger-shaped sac. Hearts x-xiii esophageal, ix lateral.

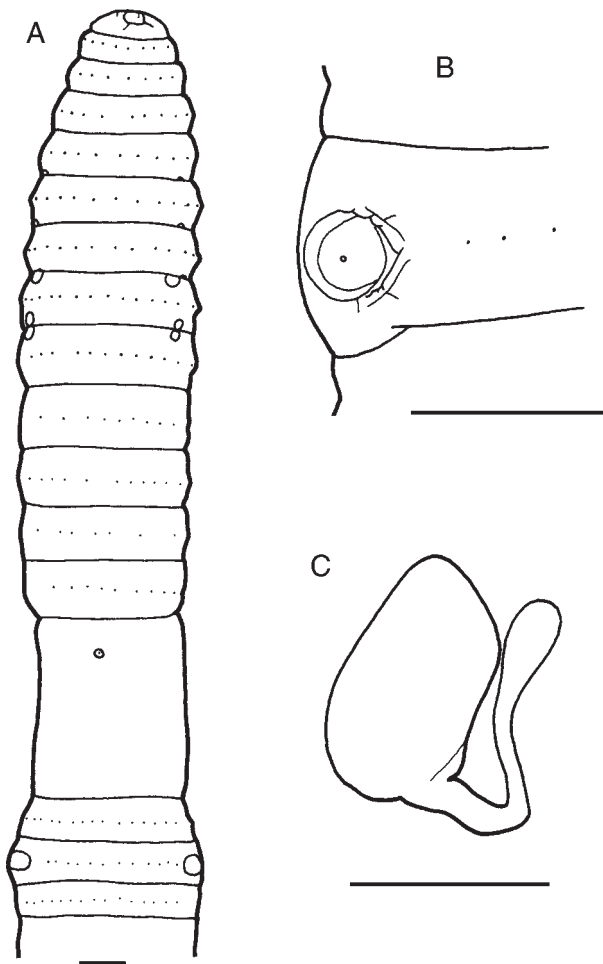


Fig. 4. *Amynthas sinsiensis* sp. nov.: A, ventral view; B, male pore region in xviii; C, spermathecae and diverticulum. Scale bars = 2 mm.

Male sexual system holandric, testes and funnels in ventral paired sacs in x, xi. Seminal vesicles small, two pairs in xi, xii. Prostates xviii small, within xvi-xix; short, thick U-shaped ducts, both glandular portions consisting of 3 or 4 main lobes, each lobe divided into leaflets.

Ovaries in xiii. Four pairs of spermathecae in vi-ix; viii long, ix short, ix larger than others; each ampulla ovate to conical, ducts long, slender in vi, vii but thicker in viii, ix; diverticula with long slender stalk, small egg-shaped terminal chamber; no nephridia on spermathecal ducts. Genital marking glands absent.

Type materials: Holotype and 2 paratypes:

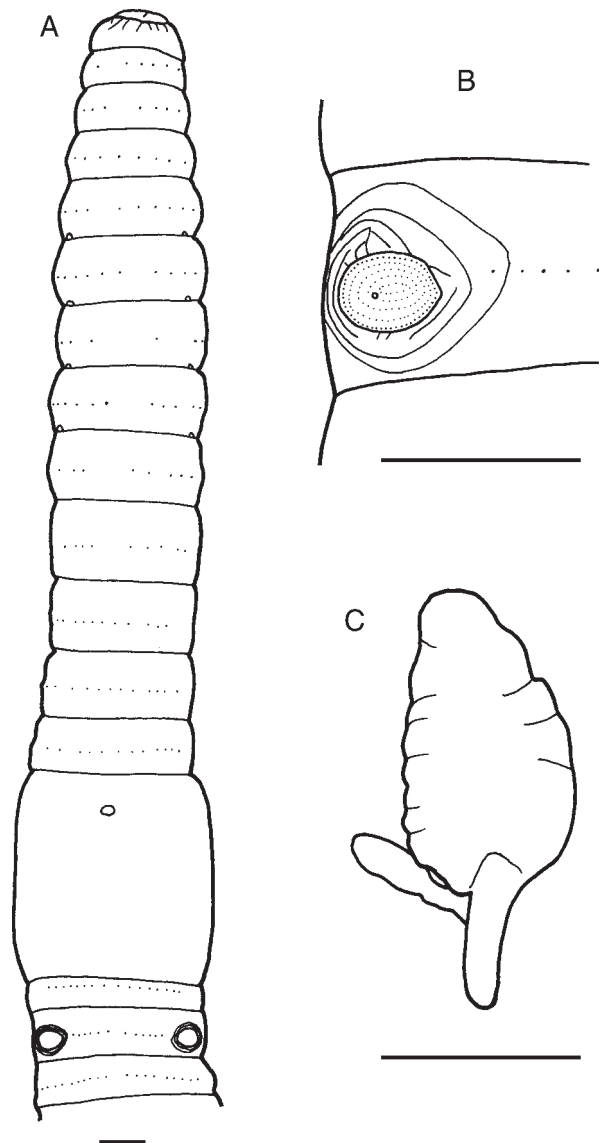


Fig. 5. *Amynthas baemsagolensis* sp. nov.: A, ventral view; B, male pore region in xviii; C, spermathecae and diverticulum. Scale bars = 2 mm.

Korea, Jeollabuk-do, Okgu-gun, Sinsi I. (35°48'-49'N, 126°27'-28'E), litter layers in forest at 5-100 m, 31 July 1996 (Y Hong).

Etymology: The species is named for its type locality.

Remarks: The species is similar to *A. monstifera*, but differs from it by the shape of the male pore region and the distribution of genital markings. Genital marking glands were not found, which is peculiar, and distinguishes *A. sinsiensis* sp. nov. from the previous 3 species described here. The Sinsi I. location is near the seaside at a low elevation. There is frequent seawater flooding, so this species is apparently tolerant of salt.

***Amyntas baemsagolensis* Hong and James**

sp. nov.

(Fig. 5A-C)

Description: Dimensions 195-213 by 6.0-6.5 mm at x, 6.9-8.1 mm at xxx, 7.3-8.5 at clitellum; body cylindrical throughout, segments 109-132. Setae beginning in ii, size and distance irregular, numbering 23 at vii, 56 at xx; twelve between male pores, setae in ii-ix larger than those of other segments; setal formula AA:AB:YZ:ZZ = 6:4:4:8 at xiii. Female pore single in xiv, oval. Prostomium epilobic, with tongue open. Dark brownish dorsally and light brownish ventrally, clitellum dark pink, formalin preservation. First dorsal pore in 12/13. Clitellum annular xiv-xvi, setae and dorsal pores not visible, externally.

Male pores near lateral margins of ventrum in xviii, on domed circular to oval porophores 1.0 × 0.6-mm diameter, surrounded by 4-6 furrows. Spermathecal pores on 1/2-round porophores with straight edges forming intersegmental furrows, rounded edges on posterior faces of v-viii. Genital markings absent.

Septa 5/6-7/8 thick, 8/9 very thin, 9/10 absent, 10/11-12/13 very thick, 13/14 thinly muscular. Gizzard in viii. Intestine beginning from xv, one pair large lymph glands along dorsal vessel from xv. Esophageal lamellae in xii-xiii. Typhlosole from xxvii, with soil, large stone in gut contents. Intestinal caeca simple, originating from xxvii, extending anteriorly to about xxiii, a large finger-shaped caeca. Hearts xi-xiii esophageal, x very small; ix lateral, one side aborted. Testes sacs 2 pairs in x, xi. Seminal

vesicles small, two pairs in xi, xii, covered by septa. Prostates xviii within xvii(xviii)-xix; thick, long ducts, both glandular portions consisting of 3 main lobes, each lobe divided into leaflets.

Ovaries in xiii. Four pairs of spermathecae in vi-ix; ix larger than other ampulla; ampulla pear-shaped, ducts at broad end, ducts shorter than ampulla; diverticula small, egg-shaped to cylindrical chambers of pearl color, stalk long, slender; no nephridia on spermathecal ducts. Genital marking on glands lacking at spermathecal porophores.

Type materials: Holotype and 3 paratypes: Korea, Jeollabuk-do, Namwon-gun, Mt. Jiri, Baemsagol (35°18'-20'N, 127°32'-33'W), soil in forest 600-1000 m, 18 Sept. 1996 (Y Hong).

Materials examined: 4 clitellate, Gyungsangbuk-do, Youngil-gun, Gigy, 19 July 1966 (SY Lee); 3 clitellate, Gyungsangbuk-do, Gampo, 15 July 1969 (MJ Song); 2 clitellate, Gyungsangbuk-do, Chogsong-gun, Dopyung, 17-22 July 1966 (JH Kiim); 1 clitellate, 1 aclitellate, Daegu-shi, 8 July 1966 (KY Paik); 1 clitellate, Gyungsangbuk-do, Gumi-shi, Mt. Kumho, 13 Aug. 1971 (ED Yeo); 8 clitellate, Gyungsangbuk-do, Ullung-gun, Dagelet I., 5 Aug. 1966 (YK Kim).

Etymology: The species is named for its type locality.

Remarks: The species is similar to *A. sinsiensis* sp. nov. and *A. monstifera*, but has a different male field and lacks genital markings other than the spermathecal porophores. This species is the same as *Pheretima* sp. 1 from Dagelet I. (Song and Paik 1969).

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巨首蚓科遠盲蚓屬(*Amyntas*)具四對受精囊之五新種蚯蚓

洪 龍¹ Samuel W. James²

不同於韓國其他遠盲蚓屬之蚯蚓，本文所描述的五新種具有四對精囊孔。此五新種分別為 *A. youngtai*、*A. kimhaeiensis*、*A. sangyeoli*、*A. sinsiensis* 與 *A. baemsagolensis*。它們和其他遠盲蚓屬種類在卵巢痕的形式及雄性生殖孔區的外觀均有區別。新種的描述包括了腹面觀與受精囊的描繪。

關鍵詞：分類，貧毛綱，巨首蚓科，遠盲蚓屬，韓國。

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