

## Four New Species of the Genus *Amyntas* Kinberg (Oligochaeta: Megascolecidae) from Korea

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**Yong Hong, Won-Koo Lee and Tae-Heung Kim (2001)** Four new species of the genus *Amyntas* Kinberg (Oligochaeta: Megascolecidae) from Korea. *Zoological Studies* 40(4): 263-268. Four new species of Korean *Amyntas* are described from Mt. Palgong, Korea: *A. palgongensis* sp. nov., *A. minjae* sp. nov., *A. pagyeiensis* sp. nov., and *A. paiki* sp. nov. All materials were from collections gathered by Song between 1969 and 1971. The first 3 species have 3 pairs of spermathecae, and the last has 2 pairs of spermathecae. Descriptions of the new species are provided, including illustrations of the ventral view, male pore region, and spermathecae. <http://www.sinica.edu.tw/zool/zoolstud/40.4/263.pdf>

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

Ms. Min-ja Song, a former Korean oligochaetologist, collected from various locations from 1965 to 1971, mainly in forests of the Korean Peninsula. Various people assisted her with collecting. Although some specimens were secured from well-known mountains, she also investigated earthworm faunas of more-isolated and poorly known regions in Korea. She reported on the following islands and mountains: Dagelet I. (Song and Paik 1969), Jeju I. (Song and Paik 1970a), Geoje I. (Song and Paik 1970b), Mt. Jiri (Song and Paik 1971), and Mt. Sopaik (Song and Paik 1973).

Korean earthworm communities in natural forests are dominated by species of the genus *Amyntas* (Megascolecidae). Song reported 9 species of this genus, including 6 new species from the 5 collections. The genus *Amyntas* is a large group with more than 300 species worldwide, and is found primarily in the southeastern part of Asia.

Intending to examine her specimens, in 1997 we visited the Dept. of Biology Education, Kyungpook National Univ., where Ms. Song completed her MS degree. On the whole, specimens were in good condition, even after 25 yr in formalin. Among them, we found some unidentified individuals, and thus we herein report 4 new species from one of the isolated

small areas which she did not publish anything.

The Mt. Palgong (1192 m) provincial park is situated approximately 10 km north of Daegu-shi, near Kyungpook National Univ., so she had easy access to Mt. Palgong for the study of earthworms. There are more records from this site than any other collection site. From a total of 11 collection dates, we examined 156 individuals. This paper deals with 4 new species of the genus *Amyntas*, three with 3 pairs of spermathecae in segments vi, vii, and viii (*A. palgongensis* sp. nov., *A. minjae* sp. nov., and *A. pagyeiensis* sp. nov.), and one with 2 pairs of spermathecae in segments vii and viii (*A. paiki* sp. nov.). All examinations were by dorsal dissection under a microscope. Illustrations were made with a drawing tube. The type material is deposited in the Korean Institute for Biodiversity Research (KIBIO), Jeonbuk National University.

### SYSTEMATIC ACCOUNTS

#### *Amyntas palgongensis* Hong sp. nov.

(Fig. 1A-C)

*Description:* Dimensions 94-120 by 3.7-4.5 mm

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at segment x, 3.6-4.5 mm at xxx, 3.5-4.4 mm at clitellum; body cylindrical throughout, segments 110-115. Setae regularly distributed around segmental equators, numbering 45 at vii, 55 at xx; 1-4 between male pores, regular; setal formula AA:AB:YZ:ZZ = 4:2:2:5 at xiii. Female pore single in xiv, 0.5 mm, oval shaped. Prostomium epilobic, with tongue open. Light 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 within clitellum.

Male pores in 2.0-mm circular discs within a 2.1 × 2.3 mm outer ring, each disc with T-shaped seminal groove, set with legs of T's pointed laterally, discs extending to 17/18, 18/19, hardened, slightly elevated. Male pore at lateral end of each T leg. Three pairs of spermathecal pores in 5/6-7/8, ventral, mainly on leading edges of vi-viii, area around each pore swollen, resembling thick lips. Genital markings absent.

Septa 5/6, 6/7, 7/8 thick, 8/9, 9/10 absent, 10/11, 11/12 thick, 12/13, 13/14 thin. Gizzard globular in viii-x. Intestine begins in xv, lymph glands small from xx. Typhlosole medium height from xxvii. Intestinal caeca simple, originating in xxvii, each finger with 8

serriform outgrowths on ventral margin. Four pairs of esophageal hearts in x-xiii, ix lateral. Male sexual system holandric, testes and funnels in x, xi. Sacs x joined dorsally, enclosing hearts ventrally. Sacs xi joined dorsally, ventrally, enclosing hearts and seminal vesicles. Two pairs of seminal vesicles in xi, xii, pseudovesicles in xiii. Prostates xviii large within xvi-xxi; ducts medium thickness, ducts entering centers of solid muscular domes; both glandular portions consisting of 3-4 main lobes, each lobe divided into leaflets.

Ovaries in xiii. Three pairs of spermathecae in vi, vii, viii; each ampulla a pear-shaped pouch; ducts short, stalked; diverticula a slender stalk with thin chamber, longer than ampulla, slightly curved, not coiled; no nephridia on spermathecal ducts.

*Type materials:* Holotype and 3 paratypes: Korea, Daegu-shi, Dong-gu, Mt. Palgong, Donghwasa, 17 July 1969 (UJ Yang).

*Materials examined:* 4 clitellate, Daegu-shi, Dong-gu, Mt. Palgong, Donghwasa, 17 July 1969 (UJ Yang); 1 clitellate, Daegu-shi, Dong-gu, Mt. Palgong, Donghwasa, 23 July 1971 (GS Kim).

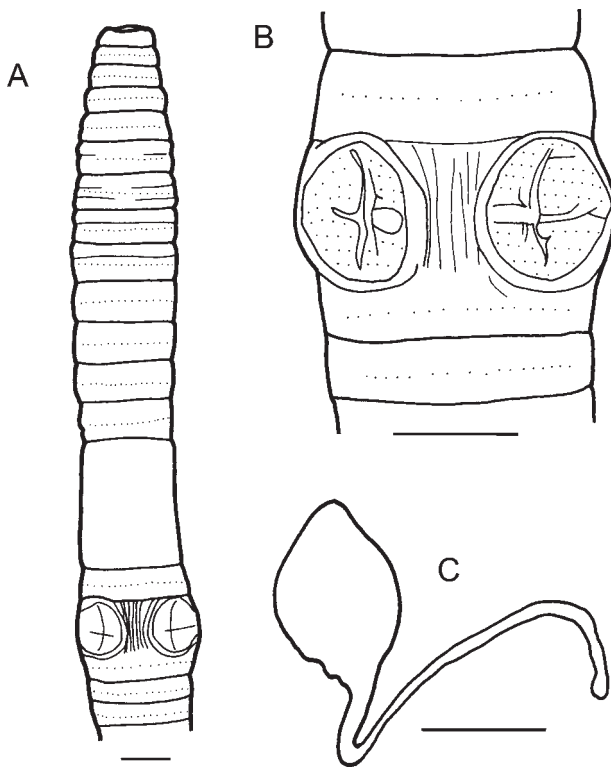
*Etymology:* The species is named for its type locality.

*Remarks:* The species is similar to *A. draconis* Hong and James, 2001, but it differs in the seminal grooves of the male discs. Species with large male discs usually do not have genital papillae glands, and *A. palgongensis* sp. nov. is similar to *A. draconis* in this regard.

***Amyntas minjae* Hong sp. nov.**  
(Fig. 2A-C)

*Description:* Dimensions 88-127 by 4.8-5.3 mm at segment x, 4.6-5.3 mm at xxx, 5.2-5.5 mm at clitellum; body cylindrical throughout, segments 76-112. Setae regularly distributed around segmental equators, numbering 55 at vii, 71 at xx; 13-14 between male pores; setal formula AA:AB:YZ:ZZ = 2:1.5:2:3 at xiii. Female pore single in xiv, 0.7 mm, oval shaped. Prostomium epilobic, with tongue open. Light 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 within clitellum.

Male pores at lateral margins of ventrum in xviii, pore with superficial bright spot near lateral margin of 0.7 × 0.4-mm pad, with furrows around lateral margin. Genital papillae absent. Three pairs of spermathecal pores in 5/6-7/8, inconspicuous, small, ventral. Genital markings absent.



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

Septa 5/6, 6/7, 7/8 thick, 8/9, 9/10 absent, 10/11, 11/12 thick, muscular, 12/13, 13/14 thick. Gizzard globular in viii-x. Intestine begins at xv, lymph glands small from xxvii. Typhlosole small from xxvii. Intestinal caeca simple, originating from xxvii, extending anteriorly to about xxiv, each consisting of 1 finger-shaped lobe, each finger with 6-7 serriform outgrowths on ventral margin. Hearts x-xiii esophageal, ix lateral. Male sexual system holandric, testes and funnels in paired sacs in x, xi; testes sacs of x joined dorsally and ventrally enclosing hearts of x; testes sacs of xi joined dorsally and ventrally, enclosing hearts and seminal vesicles of xi. Seminal vesicles, two pairs in xi and xii, less developed. Prostates xviii extending to xvii-xx; ducts short, thick, muscular, both glandular portions consisting of 2 main lobes, each lobe divided into leaflets.

Ovaries in xiii. Three pairs of spermathecae in vi, vii, viii; viii slightly larger than vii; each ampulla a small leaf-shaped pouch, ducts of medium diameter, not muscular, diverticula stalked, simple stick-shaped, as long as ducts without terminal expansion; no nephridia on spermathecal ducts.

*Type materials:* Holotype and 2 paratypes:

Korea, Daegu-shi, Dong-gu, Mt. Palgong, Donghwasa, 10 July 1969 (BS Gu).

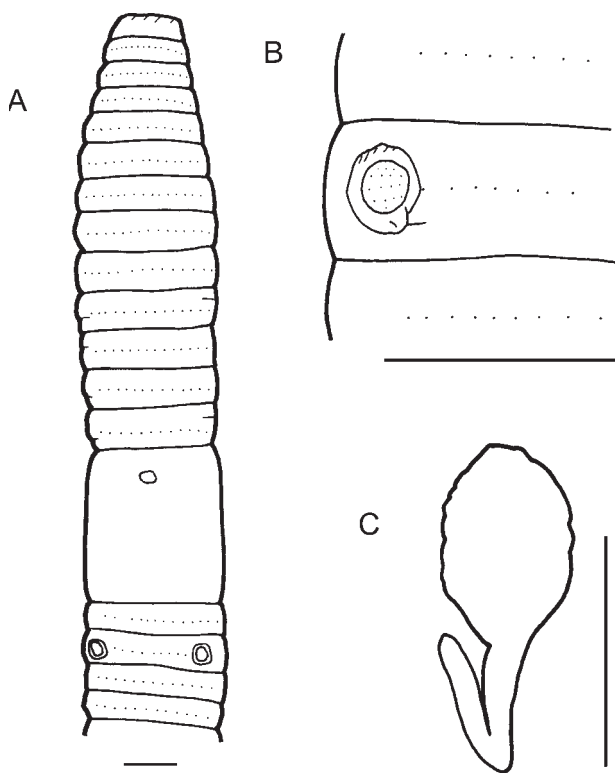
*Materials examined:* 1 clitellate, Daegu-shi, Dong-gu, Mt. Palgong, Donghwasa, 17 July 1969 (UJ Yang); 1 clitellate, Daegu-shi, Dong-gu, Mt. Palgong, Donghwasa, 23 July 1971 (GS Kim); 1 clitellate, Gyungsangbuk-do, Kimchon-shi, Mt. Hwangak, Jikjisa, 25-27 Aug. 1971 (ED Yeo).

*Etymology:* Named after Ms. Min-Ja Song, who has made great contributions to the taxonomy of Korean earthworms.

*Remarks:* The present species has 3 pairs of spermathecae and a simple, inconspicuous male field. In particular, the simple male field distinguishes it from other Korean species. In Korea, species with 3 pairs of spermathecae have them in either of 2 locations: vi-viii or vii-ix. In this paper, the 3 species are all of the vi-viii type. The previously recorded species, *A. agrestis* (Goto and Hatai, 1898), *A. phaselus* (Hatai, 1930), and *A. kamitai* (Kobayashi, 1934), also have spermathecae in vi-viii, but differ in body shape, spermathecal shape, and male pore region.

***Amyntas payeiensis* Hong sp. nov.**

(Fig. 3A-C)



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

*Description:* Dimensions 98-116 by 4.0-4.3 mm at segment x, 3.5-3.7 mm at xxx, 4.0-4.2 mm at clitellum; body cylindrical throughout, segments 110-114. Setae regularly distributed around segmental equators, numbering 31 at vii, 47 at xx; 1-5 between male pores, distance irregular; setal formula AA:AB:YZ:ZZ = 3:2:1:2 at xiii. Female pore single in xiv, 0.5 mm, oval shaped. Prostomium epilobic, with tongue open. Light brownish dorsally and ventrally, clitellum coffee colored, formalin preservation. First dorsal pore 12/13. Clitellum annular xiv-xvi; setae and dorsal pores not visible externally within clitellum.

Male discs shoe-print shaped, placed diagonally, more narrowly separated anteriorly, extending from post-setal 1/3 xvii to pre-setal 1/3 xix; diagonally oriented seminal groove on long axis of each disc, groove broadened at end, with short extension to male pore at equator xviii; discs elevated, 3.0-3.3 mm long. Spermathecal pores ventral in vi, vii, viii; close to 5/6-7/8, spermathecal pores 1.8-2.0 mm apart, inconspicuous, spermathecal pore area furrowed and hardened. Genital markings absent.

Septa 5/6-7/8 thick, 8/9, 9/10 absent, 10/11, 11/12 thick, 12/13, 13/14 with some muscle somewhat. Gizzard globular in viii-x. Intestine begins in xv, paired lymph glands on dorsal vessel from xxi. Typhlosole with low fold from xxvii. Intestinal caeca

simple, originating from xxvii, extending anteriorly to about xxii, finger-shaped sacs with small serriform pockets on ventral margin. Hearts xi-xiii esophageal, ix lateral. Male sexual system holandric, testes and funnels x, xi in ring-shaped sacs formed by dorsal and ventral fusion, enclosing other segmental contents of x, xi. Two pairs of seminal vesicles in xi, xii, with small dorsal appendage. Prostates xviii, divided into many long slender lobes extending to xvi-xx, ducts short, thick.

Ovaries in xiii. Three pairs of spermathecae in vi-viii; viii larger than vii; each ampulla a pear-shaped pouch; ducts short; diverticula slender, chamber same diameter as stalk, longer than ampulla, straight or slightly curved; not coiled; no nephridia on spermathecal ducts.

*Type materials:* Holotype and 3 paratypes: Korea, Daegu-shi, Dong-gu, Mt. Palgong, Pagyesa, 6 Sept. 1970 (YT An).

*Materials examined:* 5 clitellate, Daegu-shi, Dong-gu, Mt. Palgong, Pagyesa, 6 Sept. 1970 (YT

An).

*Etymology:* The species is named for its type locality.

*Remarks:* The species is similar to *A. deogyusanensis* Hong and James, 2001, with respect to the male disc, but it differs in the size of the disc and the number of spermathecal pores. The shoe-shaped male discs of *A. pagyeiensis* sp. nov. extend to 17/18 and 18/19, which is longer than those in *A. deogyusanensis*, and *A. deogyusanensis* has 2 pairs of spermathecae rather than 3 pairs. Also the present species seems to be closely related to *A. palgongensis* sp. nov. with which it shares the T-shaped seminal grooves, three pairs of spermathecae, and similar testis sac structure. The seminal groove length is approximately equal to the distance between the 1st spermathecal pore in 5/6 to the last in 7/8. During copulation, these seminal grooves on the male field are long enough to allow prostatic fluid and sperm to reach all 3 pairs of spermathecal pores from one position. The broader ends of the grooves seem to serve this purpose as well. This is an example of convergent evolution compared with the seminal grooves of the acanthodriline Megascolecidae.

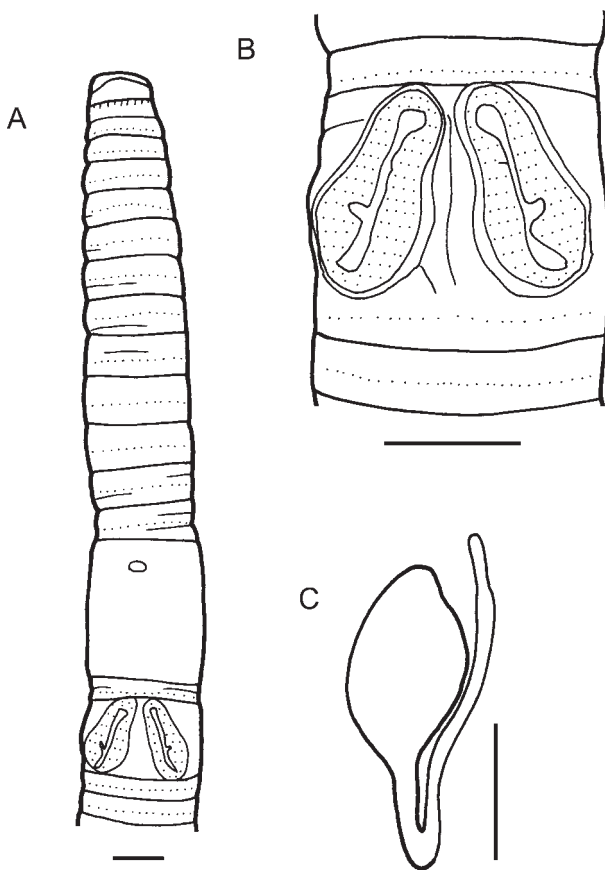
***Amyntas paiki* Hong sp. nov.**

(Fig. 4A-C)

*Description:* Dimensions 58-95 by 4.0-4.7 mm at segment x, 4.0-4.6 mm at xxx, 4.2-4.6 mm at clitellum; body cylindrical throughout, segments 55-97. Setae regularly distributed around segmental equators, numbering 58 at vii, sixty at xx; fifteen between male pores, size and distance regular; setal formula AA:AB:YZ:ZZ = 2.5:2:3:5 at xiii. Female pore single in xiv, 0.4 mm, oval shaped. Prostomium epilobic, with tongue open. Brownish dorsally and yellowish ventrally, clitellum coffee colored, formalin preservation. First dorsal pore 12/13. Clitellum annular xiv-xvi, setae and dorsal pore not visible externally within clitellum.

Male pores at lateral margins of ventrum in xviii. Diameter of male pore in dark areas 0.5 mm, within elevated pad on which is also 1 pre-setal pair of groups of small genital papillae, two left, two right. Spermathecal pores in vii, viii, close to 6/7, 7/8 ventrally. Pre-setal paired sets of 2 genital markings in segments vii, viii; placed medial-ventrally to spermathecal pores; genital markings regularly spaced within each set.

Septa 5/6, 6/7 thick, 7/8 thin, 8/9, 9/10 absent, 10/11-13/14 thick. Gizzard globular in viii-x. Intestine begins from xv, lymph glands absent. Typhlo-



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

sole lacking. Intestinal cecum manicate, originating from xxvii, extending anteriorly to about xxiv, each consisting of 6-7 finger-shaped sacs. Hearts with 3 pairs in xi-xiii, ix lateral, x lacking. Male sexual system holandric, testes and funnels in ventrally joined paired sacs in x, xi, sacs of xi enclosing seminal vesicles and hearts. Paired seminal vesicles filling most of xi, xii. Prostates xviii within xvi-xix; ducts thin, short, muscular, both glandular portions consisting of 2 or 3 main lobes. Genital papillae of xviii with stalked glands, each with 20-30 branches, near prostatic ducts.

Ovaries in xiii. Paired spermathecae in vii, viii; each ampulla flattened, furrowed; thick, short ducts less than 1/2 ampulla length, diverticula with long stalk, longer than ducts, flattened large chamber in

ectal portion; no nephridia on spermathecal ducts. Genital marking on glands about 10 mushroom-shaped, size and shape variable. Genital marking on gland ducts divided into numerous stalks some leading to separate glands; other stalks leading to combined glandular portions.

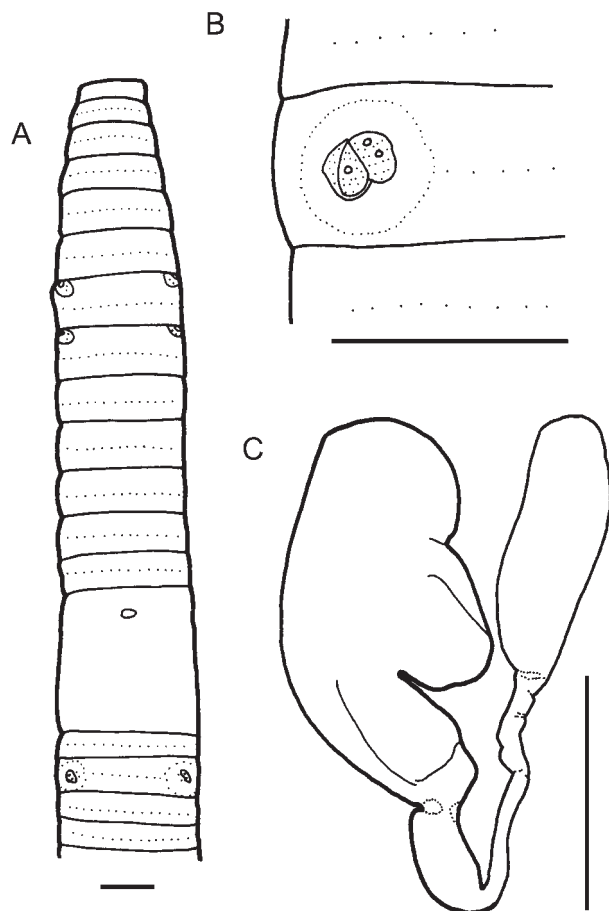
*Type materials:* Holotype and 3 paratypes: Korea, Daegu-shi, Dong-gu, Mt. Palgong, Pagyesa, 6 Sept. 1970 (YT An).

*Materials examined:* 5 clitellate, Daegu-shi, Dong-gu, Mt. Palgong, Pagyesa, 6 Sept. 1970 (YT An).

*Etymology:* Named after the late Dr. Kap-Yong Paik, Korean zoologist who passed away in 1998.

*Remarks:* The present species appears to be closely related to *A. taebaekensis* Hong and James, 2001, in the male pore region, but is easily separated by the genital papillae. *A. taebaekensis* has only 1 pair of post-setal genital papillae, as opposed to 2 pre-setal pairs in *A. paiki* sp. nov.

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

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## 韓國遠盲蚓屬(*Amyntas*)四新種(貧毛綱：巨首蚓科)

洪 龍 Won-Koo Lee Tae-Heung Kim

本研究描述了採集自韓國 Palgong 山遠盲蚓屬之四新種蚯蚓，即 *A. palgongensis*、*A. minjae*、*A. payeiensis* 與 *A. paiki*。所有的研究材料是 Song 在 1969-1971 間所採集的標本。在前述四新種裏，前三種具有三對受精囊，第四種則具有兩對。新種的描述還包括腹面觀、雄性生殖孔區與受精囊的繪圖。

**關鍵詞：**分類，貧毛綱，巨首蚓科，遠盲蚓屬，韓國。

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