

## **The Earthworm Fauna from Ulleungdo Island, Korea with One New Species of the Genus *Amyntas* (Oligochaeta: Megascolecidae)**

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### **ABSTRACT**

During the expedition of Ulleungdo Islands, Korea in September 2-4, 2004, a total of seven species were recognized. Of these, one species *Amyntas dageletensis* sp. nov. is described as new to science. *Amyntas dageletensis* sp. nov. lacks spermathecal pore, spermathecae, prostates, and male pore. These characteristics are systematically important and unique to the species among Korean members of *Amyntas*. Description of the new species is provided, including illustrations of ventral view and male pore region.

Key words: earthworms, Oligochaeta, Megascolecidae, *Amyntas*, Korea, taxonomy

### **INTRODUCTION**

Song and Paik's (1969) report on earthworms from Ulleungdo Island includes the descriptions of 10 species from three genera, *Aporrectodea*, *Eisenia*, and *Amyntas*. Of these, two species, *Aporrectodea trapezoids* (Duges, 1828) and *Eisenia fetida* (Savigny, 1826) belong to the family Lumbricidae, common earthworms in agricultural land. The rest species were placed in *Pheretima* Kinberg 1867. Species of Korean Megascolecidae were originally placed in the genus *Pheretima*,

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but was divided later by Sims and Easton (1972) into 8 genera by morphological characteristics such as origin of intestinal caeca, place of nephridia on the spermathecal ducts, and the copulatory pouches, etc. In addition, the genus *Begmius* was newly divided from *Amyntas* by Easton (1982).

The earthworm fauna of the Korea is dominated by the family Megascolecidae and it has been reported by Kobayashi (1934, 1936, 1937, 1938), Song and Paik (1969, 1970a, b, 1971, 1973), Hong and James (2001a, b), Hong and Lee (2001), Hong et al. (2001), and Hong and Kim (2002a, b).

Specimens were collected by digging and hand sorting in September 2-4, 2004 from litter layers and soils in forests from Ulleungdo Is. The Island is situated approximately 217 km east of Pohang, 92 km southeast of Dokdo Is., Seonginbong is the highest peak of the Ulleungdo Is., and besides there are other peaks close to 984 m high. It is covered with mist more than 300 days a year.

From a total of 5 locations, we examined 256 individuals of 7 species including one new species *Amyntas dageletensis* sp. nov., which we also had come across among Ms. Song's collections (1965-1966, 1968, collector Yong-Ki, Kim) at Albong, Bongrae Falls, Seonginbong, and Nari Valley. This new species lacks spermathecae, prostates, and male pores, characteristics that are systematically important and unique to the species among Korean *Amyntas*. *Amyntas hilgendorfi* (Michaelsen, 1892) and *Amyntas agrestis* (Goto and Hatai, 1899) are exotic species, and are also found at various regions of the Korean Peninsula. *Amyntas bamsagolensis* Hong and James, 2001 was recorded by Song and Paik (1969), as *Pheretima* sp. 1. And to comment farther on *Amyntas* sp. (1), *Amyntas* sp. (2), and *Lumbricidae* sp. we do not have enough clitellates and individuals at the moment.

Taxonomy in this paper follows Sims and Easton (1972). Illustrations are of anatomical views containing important features, prepared with a camera lucida. Descriptions are based on the external examination and dorsal dissection under the stereomicroscope. The holotype and paratypes of the new species are deposited in the collections of the Chonbuk National University.

## SYSTEMATIC ACCOUNTS

Family Lumbricidae Claus, 1880

Genus *Aporrectodea* Orley, 1885

### ***Aporrectodea trapezoids* (Duges, 1828)**

*Lumbricius trapezoids* Duges, 1828, p. 289.

*Allolobophora caliginosa trapezoids*: Chen, 1931, p. 168; Kobayashi, 1935, p. 130; 1938, p. 6; Song and Paik, 1969, p. 13; 1970a, p. 10; 1970b, p. 107; Hong, 2000, p. 2.

**Distribution.** Korea, China, Japan, Philippines, Russia, India, Australia, Europe, North America, South America.

Genus *Eisenia* Malm, 1877

### ***Eisenia fetida* (Savigny, 1826)**

*Eisenia fetidum* Savigny, 1826, p. 182.

*Allolobophora foetida*: Beddard, 1895, p. 702.

*Eisenia foetida*: Michaelsen, 1900, p. 475; Kobayashi, 1938, p. 6; Song and Paik, 1969, p. 14; Hong, 2000, p. 7.

**Distribution.** Korea, China, Japan, Philippines, India, Russia, Australia, Europe, North America, South America.

Family Megascolecidae Rosa, 1891

Genus *Amyntas* Kinberg, 1867

***Amyntas agrestis* (Goto and Hatai, 1899)**

*Perichaeta agrestis* Goto and Hatai, 1899, p. 17.

*Pheretima agrestis*: Hatai, 1930, p. 651; Kobayashi, 1935, p. 651; 1938, p. 141.

**Material examined.** One clitellate: Litter layers in forest, Seonginbong (37° 29.88'N, 130° 52.02'E), 982 m, Ulleungdo Is., Ulleung-gun, Gyeongsangbuk-do Province, 3 Sept. 2004 (S. W. Chon and C. M. Chon).

**Distribution.** Korea, Japan, North America.

***Amyntas heteropodus* (Goto and Hatai, 1898)**

*Perichaeta heteropoda* Goto and Hatai, 1898, p. 69.

*Pheretima heteropoda*: Ohfuchi, 1957, p. 1363; Song and Paik, 1969, p. 14.

**Distribution.** Korea, Japan, Taiwan.

***Amyntas hilgendorfi* (Michaelsen, 1892)**

*Perichaeta hilgendorfi* Michaelsen, 1892, p. 235.

*Pheretima hilgendorfi*: Hatai, 1930, p. 631; Kobayashi, 1934, p. 1; 1936, p. 42; Ohfuchi, 1957, p. 1356; Song and Paik, 1969, p. 15.

**Material examined.** 15 clitellates, 11 acitellates: Litter layers in forest, Bongrae Falls (37° 29.89'N, 130° 53.04'E), 416 m, Ulleungdo Is., Ulleung-gun, Gyeongsangbuk-do Province, 4 Sept. 2004; 29 clitellates, 5 acitellates: Litter layers in forest, Nari Valley (37° 31.05'N, 130° 52.22'E), 394 m, Buk-myeon, Ulleungdo Is., 3 Sept. 2004 (S. W. Chon and C. M. Chon).

**Distribution.** Korea, Japan, America.

***Amyntas hupeiensis* (Michaelsen, 1895)**

*Pheretima hupeiensis*: Chen, 1933, p. 251; 1936, p. 271; Song and Paik, 1969, p. 16.

**Distribution.** Korea, China, Japan, America.

***Amyntas phaselus* (Hatai, 1930)**

*Pheretima phaselus*: Hatai, 1930, p. 659; Kobayashi, 1938, p. 146; 1939, p. 751; Ohfuchi, 1957, p. 1361.

**Distribution.** Korea, China.

***Amyntas serratus* (Kobayashi, 1936)**

*Pheretima serrata* Kobayashi, 1936, p. 165; Song and Paik, 1969, p. 16.

**Distribution.** Korea.

***Amyntas bamsagolensis* Hong and James, 2001**

*Pheretima* sp. 1 Song and Paik, 1969, p. 17.

*Amyntas bamsagolensis* Hong and James, 2001, p. 274.

**Material examined.** One clitellate: Litter layers in forest, Buk-myeon, Albong (37° 30.64'N, 130° 51.67'E), 440 m, Ulleungdo Is., Ulleung-gun, Gyeongsangbuk-do Province, 3 Sept. 2004; one clitellate: Litter layers in forest, Nari Valley (37° 31.05'N, 130° 52.22'E), 394 m, Buk-myeon, Ulleungdo Is., 3 Sept. 2004; one clitellate: Litter layers in forest, Bongrae Falls (37° 29.89'N, 130° 53.04'E), 416 m, Ulleungdo Is., 4 Sept. 2004 (S. W. Chon and C. M. Chon).

**Distribution.** Korea.

**\**Amyntas dageletensis* sp. nov. (Fig. 1A-B)**

*Pheretima* sp. 2 Song and Paik, 1969, p. 17.

**Type material.** Holotype: One clitellate: Litter layers in forest, Nari Valley (37° 31.05'N, 130° 52.22'E), 394 m, Buk-myeon, Ulleungdo Is., Ulleung-gun, Gyeongsangbuk-do Province, Korea, 3 Sept. 2004 (S. W. Chon and C. M. Chon). 3 paratypes: Same data as for holotype.

**Material examined.** Same data as for holotype, 25 clitellates, 5 acitellates specimens; 5 clitellates, litter layers in forest, Seonginbong (37° 29.88'N, 130° 52.02'E), 982 m, Ulleungdo Is., 3 Sept. 2004; 12 clitellates, 3 acitellates: Litter layers in forest, Albong (37° 30.64'N, 130° 51.67'E), 440 m, Buk-myeon, Ulleungdo Is., 3 Sept. 2004; 34 clitellates, litter layers in forest, Bongrae Falls (37° 29.89'N, 130° 53.04'E), 416 m, Ulleungdo Is., 4 Sept. 2004. (S. W. Chon and C. M. Chon colls.), 10 clitellates, Ulleungdo Is., Ulleung-gun, Gyeongsangbuk-do Province, 5 Aug. 1966 (Y. G. Kim); 11 clitellates, Dodong, Ulleungdo Is., Ulleung-gun, Gyeongsangbuk-do Province, 22 July 1968 (Y. Heo).

**Description.** Brown dorsal pigment. Dimensions 101-147 by 5.0-5.2 mm at segment x, 5.3-5.5 mm at xxx, 4.5-6.2 mm at clitellum; body cylindrical throughout, segments 99-103. Setae regularly distributed around segmental equators, numbering 41 at vii, 55 at xx; 11 between male pores, spacing regular; setal formula AA : AB : YZ : ZZ = 4 : 3 : 3 : 5 at xiii. Female pore single in xiv, 0.4 × 1.0 mm, oval shaped. First dorsal pore 12/13.

Male field xviii, paired, slightly elevated round pads 1.5-mm in diameter with numerous papillae, 7-13 per side, papillae circles 0.2-mm in width; pads extend to 17/18, 18/19; male pores lacking. Spermathecal pores absent. Genital markings none.

Septa 5/6, 6/7 thick, 7/8 thin but some muscular, 8/9, 9/10 absent, 10/11, 11/12 thin, 12/13, 13/14 thin but some muscular. Gizzard globular in viii-x. Intestine begins in xv, lymph glands not found. Typhlosole low, simple from xxvii. Intestinal cecum manicate, originating in xxvii, and extends anteriorly to about xxiv, each consisting of 5 fingers. Hearts x-xiii esophageal, ix lateral.

Ovaries in xiii. Spermathecae absent. Male sexual system holandric but reduced, sperm ducts present but no iridescence on funnels; testes sacs joined ventrally. Seminal vesicles two pairs xi, xii with small dorsal appendage. Prostates absent. Genital papillae of xviii with small stalked glands corresponding approximately in number to the externally visible papillae, glands mushroom

shaped, stalks flattened, not muscular.

**Etymology.** The species is named for its type locality. The Dagelet is another name of Ulleungdo Island.

**Remarks.** This species lacks spermathecae, prostates, and male pores, but has genital papillae in the male pore region. This set of characteristics is similar to those of *Amyntas shinkeiensis* (Kobayashi, 1938), but is separated easily by shape and number of genital papillae. *A. shinkeiensis* has three genital papillae per side. Kobayashi (1938) admitted that he thought initially the male pores were to be found as usual near or between papillae, since the appearance of the male field in xviii was quite similar to that of other common species of the genus. *Amyntas dageletensis* sp. nov. has many papillae, but no male pores. This point is different again from *Amyntas koreanus* (Kobayashi, 1938), which has no male pores and no genital papillae. Also the new species is similar to *Amyntas righi* Hong and James, 2001, but differs in the shape of the male pore region, and by having fewer genital papillae than *A. righi*. This species was described as *Pheretima* sp. 2 in Song and Paik (1969). Given the loss or reduction of most sexual organs, this species is very likely male-sterile and parthenogenetic.

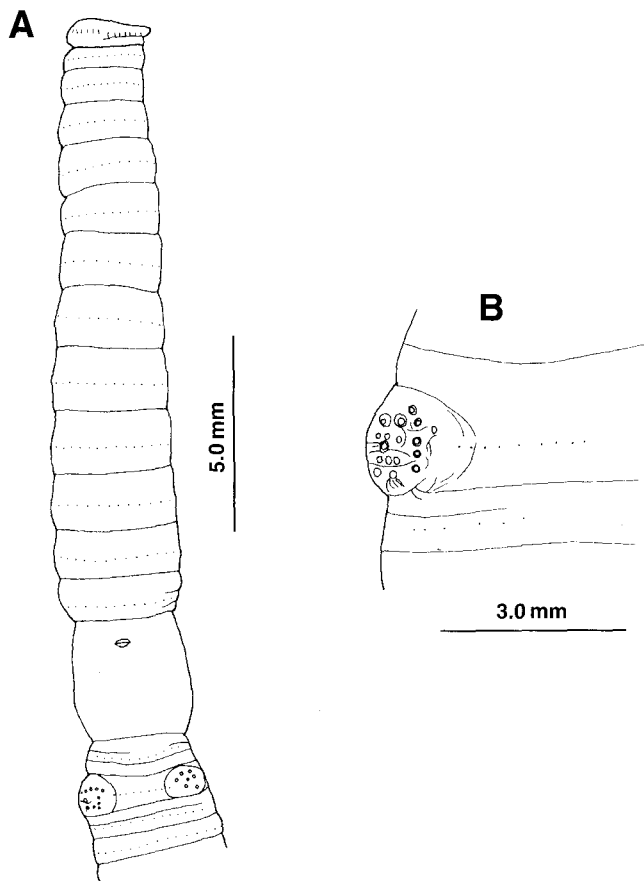


Fig. 1. *Amyntas dageletensis* sp. nov. A, ventral view; B, male pore region in xviii.

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## 울릉도 지렁이상 및 왕지렁이속의 1신종

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## 요 약

2004년 9월 2일부터 4일까지 울릉도의 5개 지점을 조사한 결과 7종 256개체를 채집하였다. 그 결과 왕지렁이속의 1신종을 확인하여 보고한다. 울릉도왕지렁이 (*Amyntas dageletensis* sp. nov.)는 저장낭구멍, 저장낭, 전립선, 숫생식구멍 등이 없는 점이 왕지렁이속의 다른 종과는 확연히 구별된다. 본 신종은 복부와 숫생식구멍의 그림을 삽입하여 기재하였다.