

# A New Record of Oribatid Mite Species, *Punctoribates hexagonus* Berlese, 1908 (Acari: Oribatida: Mycobatidae) in Korea

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## 한국산 날개응애 미기록종, *Punctoribates hexagonus* Berlese, 1908 (응애아강: 날개응애목: 사다리응애과)의 보고

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**ABSTRACT:** From the soil samples at Seonginbong in Ulleung Island, Gyeongbuk, Korea, *Punctoribates hexagonus* Berlese, 1908 is found for the first time in Korea. A diagnostic description of this species with detailed illustration and data on its geographical distribution are presented.

**Key words:** Taxonomy, Oribatida, Mycobatidae, *Punctoribates hexagonus*, Korea

**초록:** 울릉도 성인봉의 토양 시료에서 발견한 육각사다리응애 (신칭, *Punctoribates hexagonus* Berlese, 1908)를 국내에서 처음으로 보고한다. 이 종의 형태적 특징을 기재하고 지리적 분포 정보를 제시한다.

**검색어:** 분류, 날개응애목, 사다리응애과, 육각사다리응애 (신칭), 한국

The oribatid mites (Acari: Oribatida) are associated with organic matter in most terrestrial ecosystem. They are one of the most numerically dominant arthropod groups in the organic horizons of most soils (Behan-Pelletier, 1999). *Punctoribates* Berlese, 1908 is a small genus in the family Mycobatidae, having 26 known species distributed worldwide (Bayartogtokh et al., 2000). Adults are small ball-shaped. They are mostly live in the leaf litter and upper soil horizon in terrestrial ecosystem (Rajski, 1968; Seniczak et al., 2006). However, some of them, such as *Punctoribates sellnicki* Willmann, 1928 live in wet habitats, including *Sphagnum* and other mosses at the edge of

lakes (Seniczak and Seniczak, 2008).

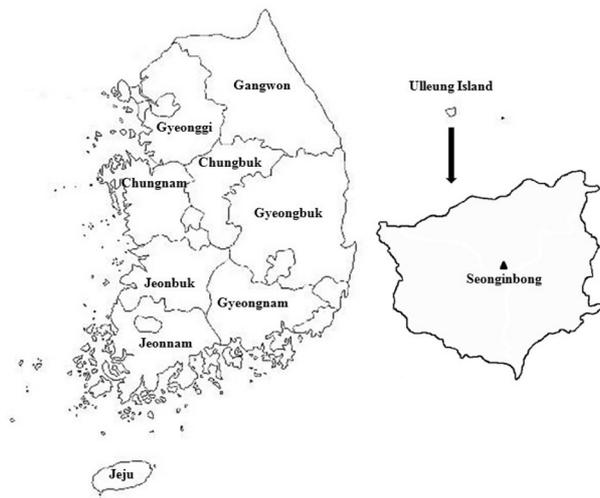
Two species of *Punctoribates*, *P. punctum* C. L. Koch, 1839 and *P. insignis* Berlese, 1910 have been recorded so far in Korea. The first species, *P. punctum* is mostly found in litter and soil of forest (Jung et al., 1998; Park et al., 1998; Lee et al., 2000), but the second species, *P. insignis* (= *Punctoribates manzanoensis* Hammer, 1958) was reported from rice paddy field (Choi, 1995).

We found the third species of *Punctoribates* collected from litter and soil in Seonginbong, Ulleung Island, Korea (Fig. 1). In this work we present a taxonomic diagnosis of the genus and species, and morphological characteristics with detailed illustration.

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Received December 16 2012; Revised February 20 2013

Accepted February 25 2013



**Fig. 1.** The collection site of *Punctoribates hexagonus* Berlese, 1908 (Seonginbong, Ulleung Island, Korea).

## Materials and methods

The specimens were collected from of Seonginbong (37° 30' 11.73"N, 130° 51' 58.15"E; 700m elevation) Ulleung Island, Korea in August 2008 (Fig. 1). The site was mostly covered with trees of *Taxus cuspidate* Siebold et Zuccarini, *Tsuga sieboldii* Carriere, *Acer mono* var. *savatieri* Nakai. Oribatid mites were extracted by using a modified Berlese-Tullgren funnel for 72 hr with 30 watt bulb (Kim and Jung, 2008; Jung et al., 2010; Kim et al., 2010; Kim et al., 2011). The extracted mites were mounted on the slides using PVA mounting medium (Downs, 1943; BioQuip, Rancho Dominguez, CA, USA). The terminology and measurements used in this paper is based on Weigmann (2006), Seniczak and Seniczak (2008), and Bayartogtokh (2010).

## Systematic accounts

Family Mycobatidae Grandjean, 1954

Genus *Punctoribates* Berlese, 1908

Syn. *Minguezetes* Subías et al., 1990

**Diagnosis.** Adults small to medium in size (308–469 µm in length; 216–378 µm in width). Rostrum rounded, with or without lateral dens. Lamella well developed, but relatively narrow. Lamellar cusp well developed, but sometimes very small. Translamella usually present, but in rare cases incons-

picuous. Interlamellar seta well developed, long, their insertions connected to each other by transverse ridge. Sensillus lanceolate, fusiform or club-shaped, but never capitate nor setiform. Enantiophysis between base of interlamellar seta and bothridium sigmoid or irregularly elongate oval in shape. Tutorium well developed, with distally pointed triangular cusp, closely appressed to prodorsum. Subcapitulum with well-developed mental tectum. Anteromedian tectum of notogaster projecting forwards as a convex, concave or trapezoid process and covering the bases of interlamellar seta and transverse ridge between them. Posterior notogastral tectum undivided. Ten pairs of small, sometimes indistinct notogastral setae present, frequently some or all setae represented by microsetae or only by their alveoli. Octotaxic system expressed as four pairs of porose areas. Pteromorpha large, semimovable, with only posterior half hinged. Custodium short or absent. Circumpedal carinanot merging with custodium or discidium. Epimeral setation 3-1-3-3. Six pairs of genital, one pair of aggenital, two pairs of anal and three pairs of adanal setae present. Legs heterotridactylous, with lateral claws much thinner than empodial claw (Bayartogtokh et al., 2000).

**Distribution.** Palearctic, Nearctic, Neotropical, Oriental, Australian, Ethiopian regions (as described in Bayartogtokh et al., 2000)

*Punctoribates hexagonus* Berlese, 1908 (Figs. 2-3)

*Minguezetes hexagonus*: Subías et al., 1990; Pérez-Iñigo, 1993; Pavlitschenko, 1994; Subías, 2004

육각사다리응애 (신칭)

**Diagnosis.** Adult body length 355 µm and width 288 µm. Body color dark and chestnut brown. Prodorsum: tip of rostrum round; lamellar seta (*le*) narrow and rough. Interlamellar seta (*in*) similar in shape to *le*. Seta *le* relatively long, but shorter than seta *in*. All prodorsal setae barbed. Lamella narrow and shorter than translamella; sensillus (*ss*) with relatively long stalk and club-shaped or distally narrowed head, directed anteromedially. Notogaster: anterior notogastral tectum concave medially, fore-end of this tectum relatively short, sharp, middle part of tectum with “U” form; anterior notogastral tectum projected far forward, and covers partly lamella and translamella, bothridium (*bo*) and basal parts of setae *in* and *le*;

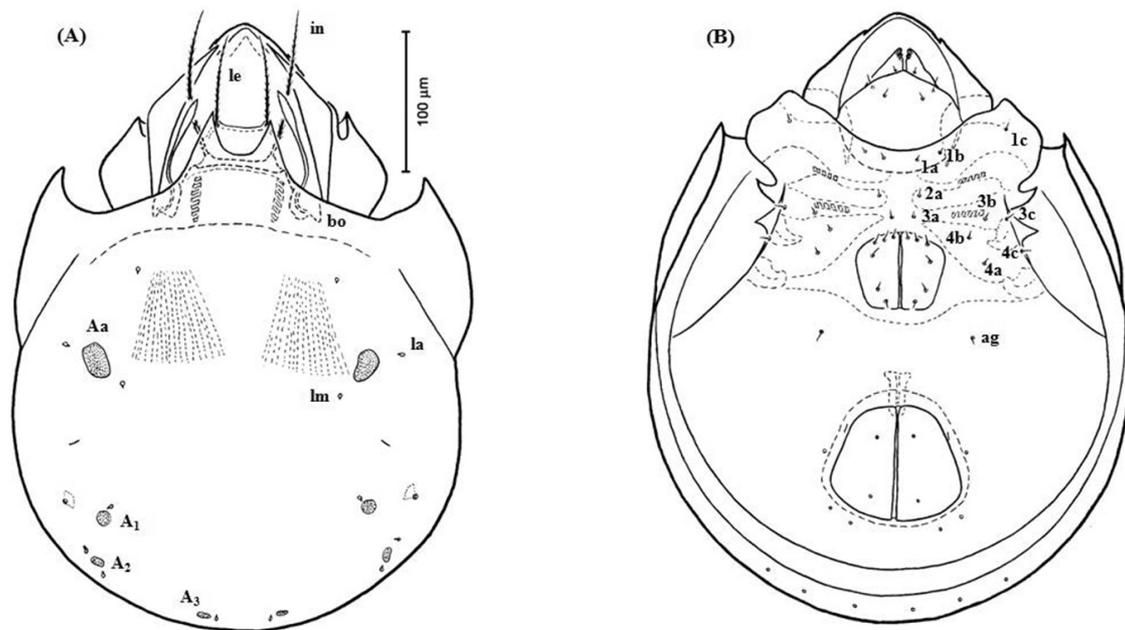


Fig. 2. *Punctoribates hexagonus* Berlese, 1908. (A) Dorsal aspect. (B) Ventral aspect.

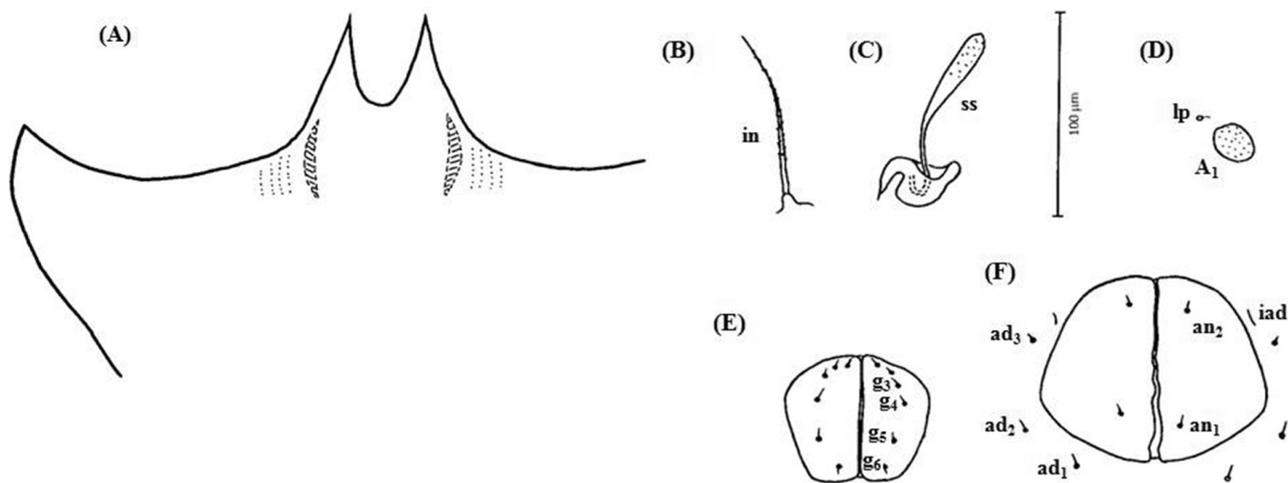


Fig. 3. *Punctoribates hexagonus* Berlese, 1908. (A) Anterior notogastral tectum. (B) Interlamellar seta (*in*). (C) Sensillus (*ss*) and bothridium. (D) Notogastral seta *lp* and porose area *A*<sub>1</sub>. (E) Genital plates with setae. (F) Anal plates and adanal setae.

The fore part of notogaster trapezoidal profile and hind part oval in outline, having ten pairs of setal pores and four pairs of porose areas, with *Aa* largest and elongated, which is positioned near setae *lm* and *la*, *A*<sub>2</sub> oval in shape and smaller than *A*<sub>1</sub>. Pair of thickened bands associated with medial process. Ventral side: epimeral setation 3-1-3-3, genital plates with six pairs of genital setae (*g*), thin and smooth (four arranged on anterior and other two on posterior half of the plate), one pair of aggenital setae (*ag*), two pairs of anal (*an*)

and three pairs of adanal setae (*ad*), *ad* located close to the lateral margin of anal plate; legs heterotridactylous with a strong empodial claw and slimmer lateral claws.

**Distribution.** Palaearctic Region: Korea (new record), Siberia, Russian Far East, Kazakhstan, Mongolia, Japan; Europe; Oriental Region: Vietnam. (as described in Bayartogtokh, 2010)

**Remarks.** This species can be distinguished from *P. insignis* by

the smaller size of anterior notogastral tectum and translamella covering prodorsum. It prefers salty soils (Rajski, 1968; Seniczak et al., 1985; Weigmann, 2006), and seemed to be related to the moist habitats (Seniczak and Seniczak, 2008). It also occurs in meadows (Bielska and Paszewska, 1995).

## Key to adults of *Punctroibates* Berlese species in Korea

1. Medial process of anterior notogastral tectum large, forming two lateral projections with a concave incision between them; lamellae, translamella and lamellar cusps small, poorly developed, situated underneath the notogastral tectum ..... **2**
- Medial process of anterior notogastral tectum small, convex, without lateral projections; translamella and lamellar cusps large, well developed, extending well beyond notogastral tectum ..... ***P. punctum* (C. L. Koch, 1839)**
2. Medial process of anterior notogastral tectum relatively small, partly covering prodorsum up to level of translamella; genital plates smooth; body relatively small, 330-366 µm in length, 270-318 µm in width ..... ***P. hexagonus* (Berlese, 1908)**
- Medial process of anterior notogastral tectum relatively large, covering most of prodorsum beyond level of translamella; genital plates with longitudinal striations, body relatively large, 378-469 µm in length, 301-378 µm in width ..... ***P. insignis* (Berlese, 1910)**

## Acknowledgement

This study was funded by Rural Development Administration project (Project No. PJ9069992012). Jiwon Kim was supported by 2<sup>nd</sup> stage “Brain Korea 21 program”, Andong National University from the Ministry of Education and Human Resources Development, Korea.

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