

## Two New Species of Oribatid Mites (Acari: Oribatida) from Korea

Seong-Sik Choi\*, Badamdorj Bayartogtokh<sup>1,2</sup>, and Jun-ichi Aoki<sup>1</sup>

Laboratory of Plant Protection, College of Agriculture, Wonkwang University, Iksan 570-749, Korea:

<sup>1</sup>Department of Soil Zoology, Institute of Environmental Science and Technology,  
Yokohama National University, Yokohama 240-8501, Japan;

<sup>2</sup>Department of Zoology, Faculty of Biology, National University of Mongolia, Ulaanbaatar 210646, Mongolia

### Key Words:

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Two new species of oribatid mites, *Dicastrribates tenuisetosus* sp. nov. and *Liacarus unjangensis* sp. nov. are described from Korea. *Dicastrribates tenuisetosus* sp. nov. is easily distinguishable from a single known species, *D. heterotrichus* (Mahunka, 1984) from Paraguay by the presence of 14 pairs of distally attenuate notogastral setae, the smooth rostral and lamellar setae, the relatively short and distally attenuating interlamellar setae, the relatively short sensilli with distinctly clavated head, and presence of two and six setae on epimeral region III and genital plate. *Liacarus unjangensis* sp. nov. can be easily distinguished from most other known species by the very wide lamellae which cover dorsally whole prodorsum, the presence of equal sized inner and outer teeth of lamellar cusps and the minute rostral, lamellar and interlamellar setae.

In the course of a taxonomic study on oribatid mites of Korea, two new species belonging to the genera *Dicastrribates* and *Liacarus* were found. The oribatid mite genus *Dicastrribates* was established by Balogh and Balogh (1988) based on the species *Sacculobates heterotrichus* Mahunka, 1984. The genus has been monotypic and distribution of the type species has hitherto been restricted within Paraguay, South America. We found one species belonging to this genus from Korea, but apparently differing from the South American species. We describe it as a new, second species of *Dicastrribates*. The genus *Liacarus* Michael is one of the largest groups of apterogasterine oribatid mites, with more than 80 known species distributed worldwide. In Korea the genus has been represented by 11 species, to which we add one more here.

### Description of Species

Family Hermannieillidae Grandjean, 1934  
Genus *Dicastrribates* Balogh and Balogh, 1988  
*Dicastrribates tenuisetosus* sp. nov.  
(Figs. 1-2)

### Diagnosis

Rostral and lamellar setae smooth; interlamellar setae not reaching the level of insertions of rostral setae; sensilli with distinctly barbed clavate head; 14 pairs of notogastral setae with short but dense barbs attenuate distally; six pairs of genital setae; solenidia 1 of tibia I, of tibiae II-IV and of genua I-III coupled each with seta *d*.

### Measurements

Body length: 580-632  $\mu\text{m}$ ; length of notogaster: 392-432  $\mu\text{m}$ ; width of notogaster 368-416  $\mu\text{m}$ .

### Integument

Prodorsum, notogaster, and ventral plate foveate. Foveae of prodorsum and ventral plate well separated, but a small number of foveae of notogaster rarely fused each other longitudinally producing oval or guitar-shaped, and each fovea contains one or two dark points.

### Prodorsum

Rostrum rounded; rostral seta (*ro*) moderately long and thick, smooth. Lamellar seta (*le*) longer than *ro*, smooth. Both of these setae situated on distinctly developed apophyses. Interlamellar seta (*in*) relatively thick, nearly as long as *le*, attenuate distally, with short, but dense barbs. Bothridium (*bo*) situated

\* To whom correspondence should be addressed.  
Tel: 82-63-850-6667, Fax: 82-63-850-7308  
E-mail: oribacho@wonkwang.ac.kr

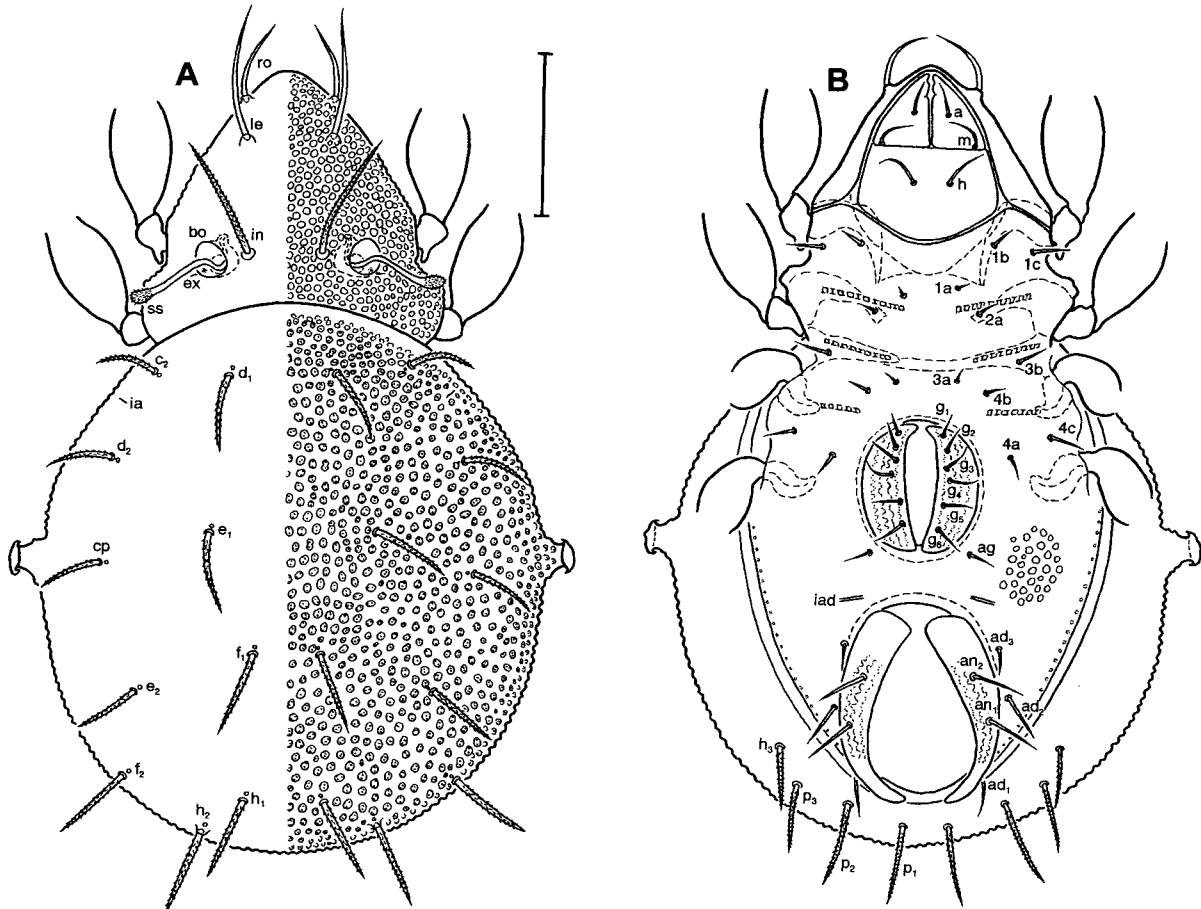


Fig. 1. *Dicastribatetes tenuisetosus* sp. nov. A, Dorsal view. B, Ventral view. Scale bar=100  $\mu$ m.

somewhat distant from lateral margin of prodorsum and close to the alveolus of interlamellar seta. Exobothridial seta (*ex*) minute, smooth, situated posterolaterad of bothridium. Sensillus (*ss*) slightly shorter or almost as long as lamellar seta; with relatively long stalk, and a small but conspicuously barbed clavate head (Fig. 1A).

#### Notogaster

Oval in shape, anterior and posterior margins broadly rounded. Fourteen pairs of notogastral setae nearly as long as seta *ro*, relatively thick, with short, but dense barbs. All notogastral setae attenuate distally, nearly same in length to one another. Lyrifissure *ia* well developed, other lyrifissures not evident (Fig. 1A).

#### Epimeral region

Apodemes *apo.2*, *apo.sj* and *apo.3* well developed, slightly aligned obliquely. Epimeral setae short, smooth, but relatively thick, setae *3c* absent (Fig. 1B). Epimeral setal formula: 3-1-2-3.

#### Ano-genital region

Genital aperture almost round, slightly longer than wide. Genital plates with irregular rough sculpture and six pairs of smooth setae arranged along inner margin. Aggenital seta smooth, nearly as long as genital ones. Anal aperture elongate oval, anal plates with irregular sculpture. Two pairs of anal and three pairs of smooth adanal setae; seta *ad3* nearly as long as genital setae, but other setae of anal region much longer than those of genital region. Adanal lyrifissure *iad* situated anterior to seta *ad3*. Very small internal pores situated along lateral margins of ventral plate (Fig. 1B).

#### Legs

Structure and setation of legs I-IV as shown in Fig. 2. Trochantera III, IV and femora I-IV with large porose areas. Distal setae of tarsi I-IV hooked distally. Solenidia 1 of tibia I, of tibiae II-IV and of genua I-III coupled each with seta *d*.

#### Materials examined

Holotype (female) and three paratypes (two females

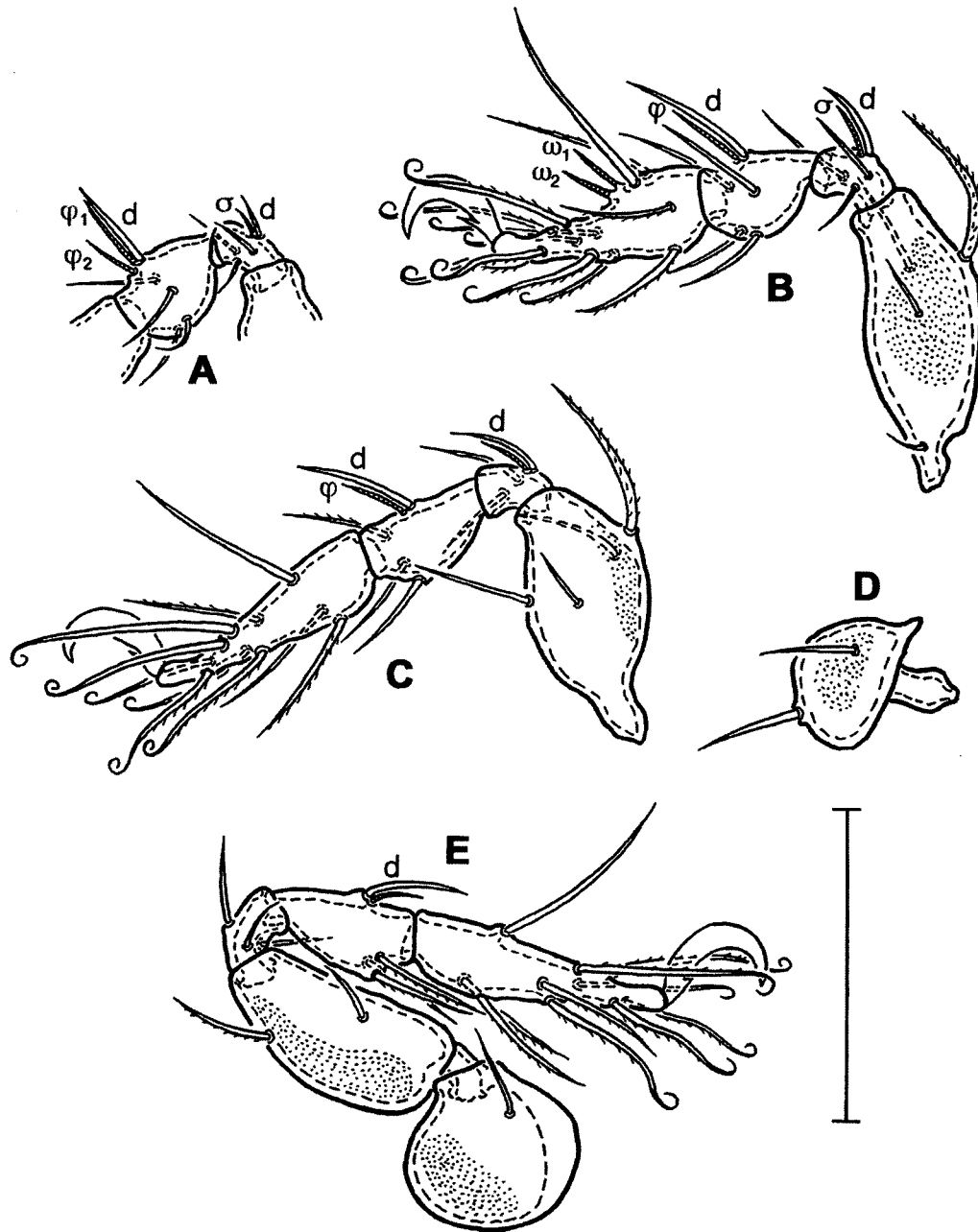


Fig. 2. *Dicastribates tenuisetosus* sp. nov. A, Genu and femur I (left, antiaxial view). B, Leg II (left, antiaxial view). C, Leg III (left, paraxial view. D, Trochanter III (right, paraxial view). E, Leg IV (left, antiaxial view). Scale bar=100  $\mu$ m.

and one male): Baikrockdam (1950 m above the sea level, Mt. Hallasan), Jeju-do (the southernmost island of Korea), 16 October, 1997, leg. S. S. Choi. All the type specimens are deposited in the Collection of the Laboratory of Plant Protection, College of Agriculture, Wonkwang University, Iksan, Korea.

**Remarks**

This new species is easily distinguishable from the

type species of the genus, *D. heterotrichus*, described by Mahunka (1984) from Paraguay by 1) the presence of 14 pairs of distally attenuating notogastral setae as opposed to the presence of 13 pairs of distally strongly dilated notogastral setae in *D. heterotrichus*; 2) the smooth rostral and lamellar setae as opposed to the barbed setae in *D. heterotrichus*; 3) the relatively short and distally attenuating interlamellar setae as opposed to very long interlamellar setae in *D. heterotrichus* extending beyond the tip of rostrum; 4) the relatively

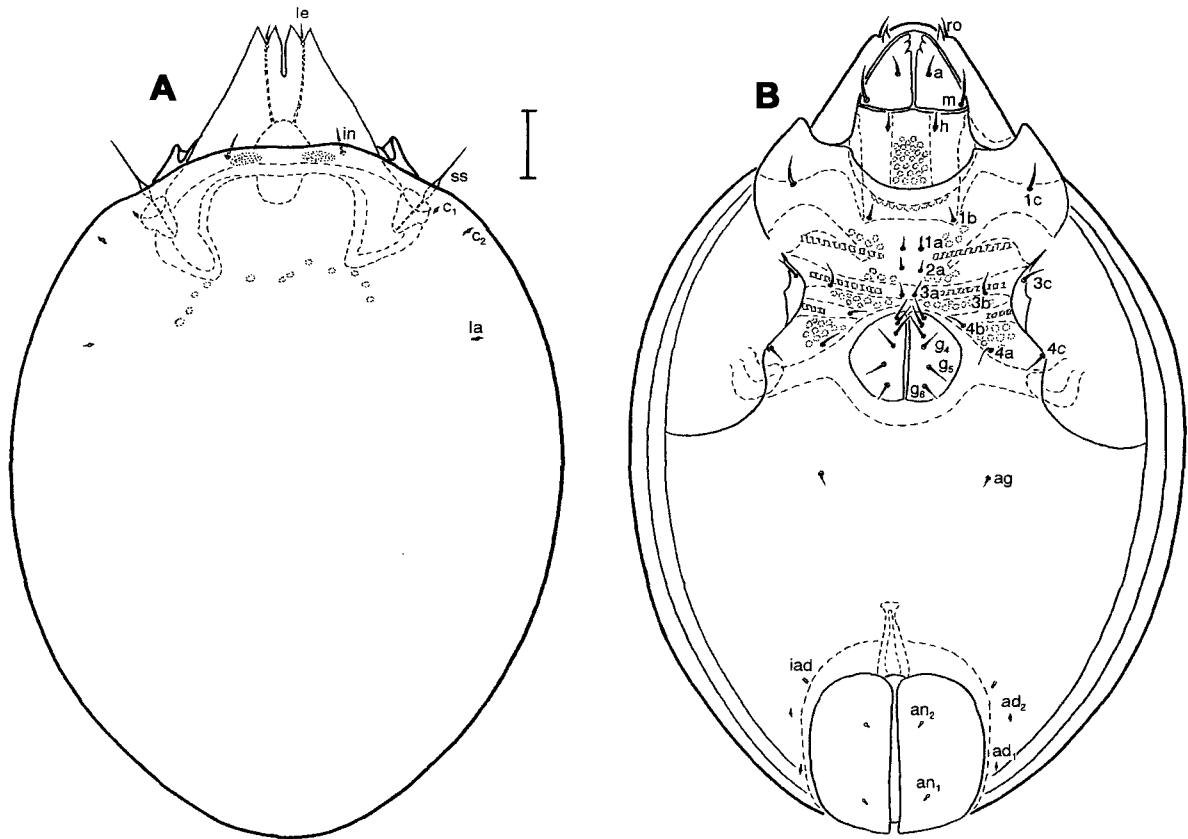


Fig. 3. *Liacarus unjangensis* sp. nov. A, Dorsal view. B, Ventral view. Scale bar=100  $\mu$ m.

short sensilli with distinctly clavated head as opposed to the long and slightly thickening distal sensilli in *D. heterotrichus*; and 5) the presence of two and six setae on epimeral region III and genital plate, respectively, as opposed to the presence of three and seven setae on the respective regions.

#### Etymology

The specific name *tenuisetosus* refers to the distally pointed notogastral and interlamellar setae.

Family Liacaridae Sellnick, 1928  
 Genus *Liacarus* Michael, 1898  
*Liacarus unjangensis* sp. nov.  
 (Figs. 3-5)

#### Diagnosis

Very large, dark to black species; lamellae very large, fused medially, completely covering the prodorsum in dorsal view; lamellar cusps well developed, inner and outer teeth nearly equal in size; rostral, lamellar and interlamellar setae very short, and thin; sensilli fusi-form, distal portion long, pointed in fine tip; notogastral setae represented by their alveoli, only insertions of seven pairs of notogastral setae present.

#### Measurements

Body length: 1140-1160  $\mu$ m; length of notogaster: 959-1045  $\mu$ m; width of notogaster 764-868  $\mu$ m.

#### Integument

The integument is nearly smooth and shiny in reflected light at low magnification, but at high magnification the lateral part of prodorsum and peripheral regions of ventral plate exhibit minute granulation.

#### Prodorsum

Rostrum not visible in dorsal view, but in ventral aspect tip of rostrum broadly rounded and laterally with a distinct tooth on each side. Rostral seta (*ro*) minute, about 58  $\mu$ m in length, thin, smooth (Figs. 3A and 5A). Lamellae very large and broad, fused medially, completely covering the prodorsum in dorsal view. Lamellar cusps well developed, close to each other and separated by a narrow interspace; each cusp dentate at tip, with inner and outer teeth nearly equal in size. Lamellar seta (*le*) also minute, about 49  $\mu$ m in length, smooth, its insertion situated under anterior part of lamellar cusps (Figs. 3A and 4A). Interlamellar seta (*in*) slightly longer than *le*, smooth, its insertion situated

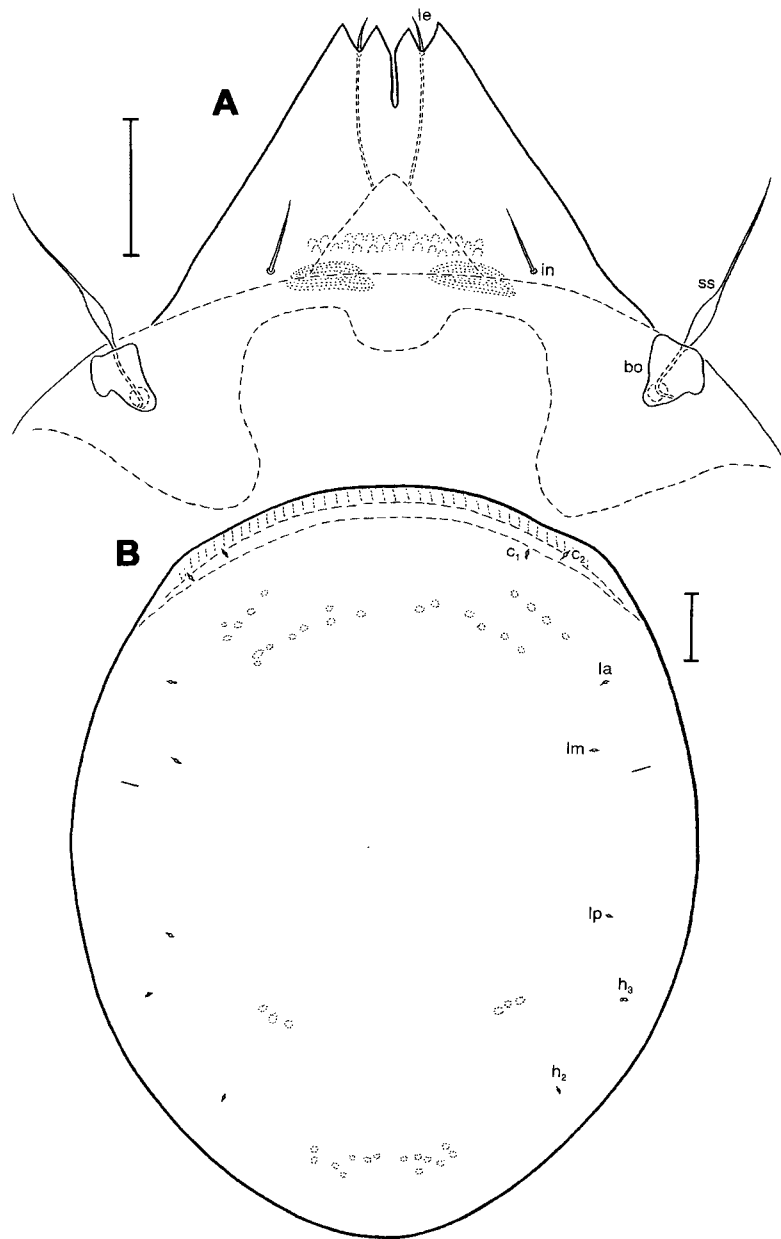


Fig. 4. *Liacarus unjangensis* sp. nov. A, Prodorsum and anterior part of opisthosoma (after removing notogaster). B, Notogaster (after separation from opisthosoma). Scale bar=100  $\mu$ m.

under anterior part of notogaster. Bothridium (*bo*) completely covered by notogaster. Exobothridial seta not evident. Sensillus (*ss*) fusiform, its median part distinctly thickened in the swollen portion, and distally tapered in a pointed tip (Figs. 3A, 4A, and 5B).

**Notogaster**

Oval in shape and slightly narrowed toward posterior direction, its anterior margin almost straight or broadly rounded, but posterior margin more or less narrowly rounded. Notogastral setae represented only by their

alveoli. Due to very thick dark colored cerotegument, determination of setal insertions was very hard, and after total separation the notogaster from opisthosoma seven pairs of setal alveoli were found (Figs. 3A and 4B).

**Epimeral region**

Apodemes *apo.2*, *apo.sj* and *apo.3* well developed, slightly aligned obliquely. Epimeral setae moderately long, smooth. Epimeral setal formula: 3-1-3-3. Discidium and circumpedal carina well developed (Figs. 3B and 5A).

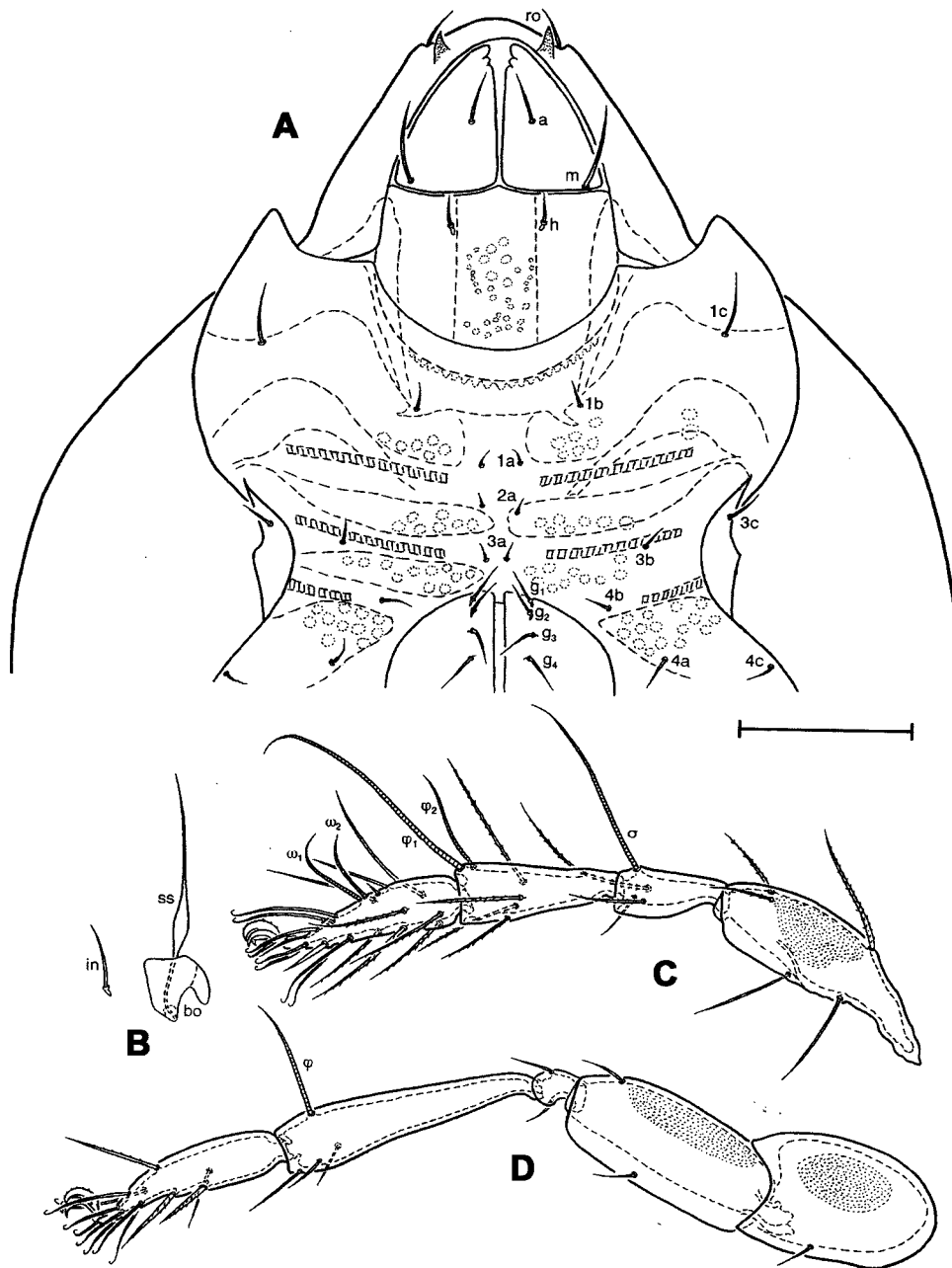


Fig. 5. *Liacarus unjangensis* sp. nov. A, Gnathosomal and epimeral regions. B, Sensillus, bothridium and interlamellar seta. C, Leg I (left, antiaxial view). D, Leg IV (left, paraaxial view). Scale bar=100  $\mu$ m.

#### Ano-genital region

Genital aperture nearly pentagonal, slightly wider than long. Genital plates with six pairs of moderately long and smooth setae. Aggenital setae short, smooth, about half as long as genital ones. Anal aperture nearly quadrangular, two pairs of anal and adanal setal alveoli present; seta *ad1* not evident, but with a possibility that setal alveolus is concealed under posterior part of anal plate. Adanal lyrifissure *iad*

situated anteromedial of seta *ad3* (Fig. 3B).

#### Legs

Structure and setation of legs I and IV as shown in Figs. 5C & D. Tarsi heterotridactylous, median claw with a few serration on its dorsal edge. Trochantera III, IV and femora I-IV with large porose areas. Distal setae of tarsi I-IV hooked distally. Solenidion 1 of tibia I much longer than 2; solenidion of genu I very long,

longer than solenidion of tibia II.

#### Materials examined

Holotype (female) and two para-types (one female and one male): Mt. Unjang-san (730 m above the sea level), Juchon-myun, Jinan-gun, Chunbuk-do, southwestern Korea, 24 April, 1999, leg. S. S. Choi. All the type specimens are deposited in the Collection of the Laboratory of Plant Protection, College of Agriculture, Wonkwang University, Iksan, Korea.

#### Remarks

This new species can be easily differentiated from most other known species of *Liacarus* by the very wide lamellae which cover dorsally whole prodorsum, the presence of equal sized inner and outer teeth of lamellar cusps, and the minute rostral, lamellar and interlamellar setae.

In spite of these principal differences, the following species *L. latus* and *L. bidentatus* described by Ewing (1909, 1918) and *L. spiniger* described by Jacot (1937) and redescribed by Woolley (1958, 1968) resemble the new species in the general type of lamellae and sensilli. However, all of these North American species are clearly distinguishable from *L. unjangensis* sp. nov. by the 1) long rostral, lamellar, interlamellar setae as opposed to the minute setae in *L. unjangensis* sp. nov.; 2) conspicuously barbed sensilli as opposed to the smooth sensilli in *L. unjangensis* sp. nov.; 3) presence of well-developed notogastral setae (*L.*

*bidentatus* and *L. spiniger*) or only one pair of setal alveoli (*L. latus*) as opposed to the presence of seven pairs of setal alveoli in *L. unjangensis* sp. nov.; 4) presence of well-developed anal and adanal setae as opposed to the absence of true setae in *L. unjangensis* sp. nov; and 5) smaller body size.

#### Etymology

The specific name *unjangensis* refers to the type locality of this species.

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