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## A taxonomic study of Korean *Aloconota* Thomson (Coleoptera: Staphylinidae: Aleocharinae) with descriptions of five new species

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### ABSTRACT

A taxonomic study of Korean species of the Geostibine genus *Aloconota* is presented. The genus is represented in Korea by seven species including five new species described in this study, namely, *Aloconota brunnea* Lee and Ahn, sp. nov., *Aloconota hydrosmectoides* Lee and Ahn, sp. nov., *Aloconota impressa* Lee and Ahn, sp. nov., *Aloconota parviocularis* Lee and Ahn, sp. nov. and *Aloconota tuberculata* Lee and Ahn, sp. nov. A key to species, descriptions and illustrations of habitus and diagnostic characters are provided for all seven species.

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*Aloconota*; Korea

## Introduction

Thomson (1858) first proposed the genus *Aloconota* based on *Tachyusa immunita* Erichson. *Aloconota* Thomson differs from other Geostibine genera by having empodial seta distinctly longer than claw. All specimens of Korean *Aloconota* species except for *Aloconota sulcifrons* (Stephens) are found only near streams (Cameron 1939; Ashe 2001). This genus includes 105 species in the Palaearctic region. In East Asia, 31 species from China and four species from Japan have been recorded (Schülke and Smetana 2015). Pašnik (2001) first recorded the genus with three described species, *Aloconota koreana*, *A. sulcifrons* and *Aloconota unica*, in Korea. Later, two of them, *A. koreana* and *A. unica*, were transferred to the genera *Earota* Mulsant and Rey and *Tropimemonylon* Pace, respectively. Recently Lee and Ahn (2014) described a new species, *Aloconota elongata*, in Korea.

In this study we recognize seven *Aloconota* species in Korea including five new species, *Aloconota brunnea* Lee and Ahn, sp. nov., *Aloconota hydrosmectoides* Lee and Ahn, sp. nov., *Aloconota impressa* Lee and Ahn, sp. nov., *Aloconota parviocularis* Lee and Ahn, sp. nov. and *Aloconota tuberculata* Lee and Ahn, sp. nov. A key to Korean species, descriptions, habitus photographs and line drawings of diagnostic characters are provided.

## Material and methods

The North Korean species *A. sulcifrons* (Stephens) was examined by the first author in the Institute of Systematics and Evolution of Animals (ISEA), Kraków, Poland. All the other examined specimens are deposited in the Chungnam National University Insect Collection (CNUIC), Daejeon, Korea. We compared them with type and voucher specimens of *Aloconota* species in the Field Museum of Natural History (FMNH), Chicago, IL, USA, Museum für Naturkunde (MNH), Berlin, Germany and the Natural History Museum (NHM), London, UK to have more reliable identifications.

Dry specimens for scanning electron microscope photographs were sputter-coated with Pt/Pd nanoparticles by Cressington 208 HR (Cressington Scientific Instruments Ltd., Watford, UK) and examined under scanning electron microscopy (S-4800, Hitachi, Tokyo, Japan). The terms used here followed Sawada (1972), but we followed Ashe (1984) in some cases, particularly for mouthparts, to reduce confusion.

## Taxonomy

Class **INSECTA** Linnaeus, 1758  
 Order **COLEOPTERA** Linnaeus, 1758  
 Family **STAPHYLINIDAE** Latreille, 1802  
 Subfamily **ALEOCHARINAE** Fleming, 1821  
 Tribe **GEOSTIBINI** Seevers, 1978  
 Genus ***Aloconota*** Thomson, 1858

*Aloconota* Thomson, 1858: 33 (Type species: *Tachyusa immunita* Erichson, 1840).

*Glossola* Fowler, 1888: 66 (Type species: *Homalota gregaria* Erichson, 1839a).

*Terasota* Casey, 1906: 337 (Type species: *Terasota brunneipes* Casey, 1906).

## Diagnosis

Members of the genus *Aloconota* can be distinguished from other aleocharine genera by the combination of the following characters: body parallel-sided;  $\alpha$ -sensillum of epipharynx reduced; labium with ligula expanded, dilated basally, divided into two lobes at base; prementum with two medial setae widely separated, lateral pseudopores absent; twin pores of labial palpomere one small; pronotum more or less narrow basally, less than c.1.1 times as wide as long; mesocoxal cavities narrowly separated; mesoventral process pointed at apex; metatarsomere 1 longer than 2 or about as long as 2 and 3 combined; empodial seta distinctly longer than claw; abdominal tergites III–V impressed in basal region; most male tergite VII with tubercles; posterior margin of male tergite VIII modified, with process (Cameron 1939; Benick and Lohse 1974; Yosii and Sawada 1976; Ashe 2001).

## Distribution

Worldwide.

## Key to Korean species of the genus *Aloconota*

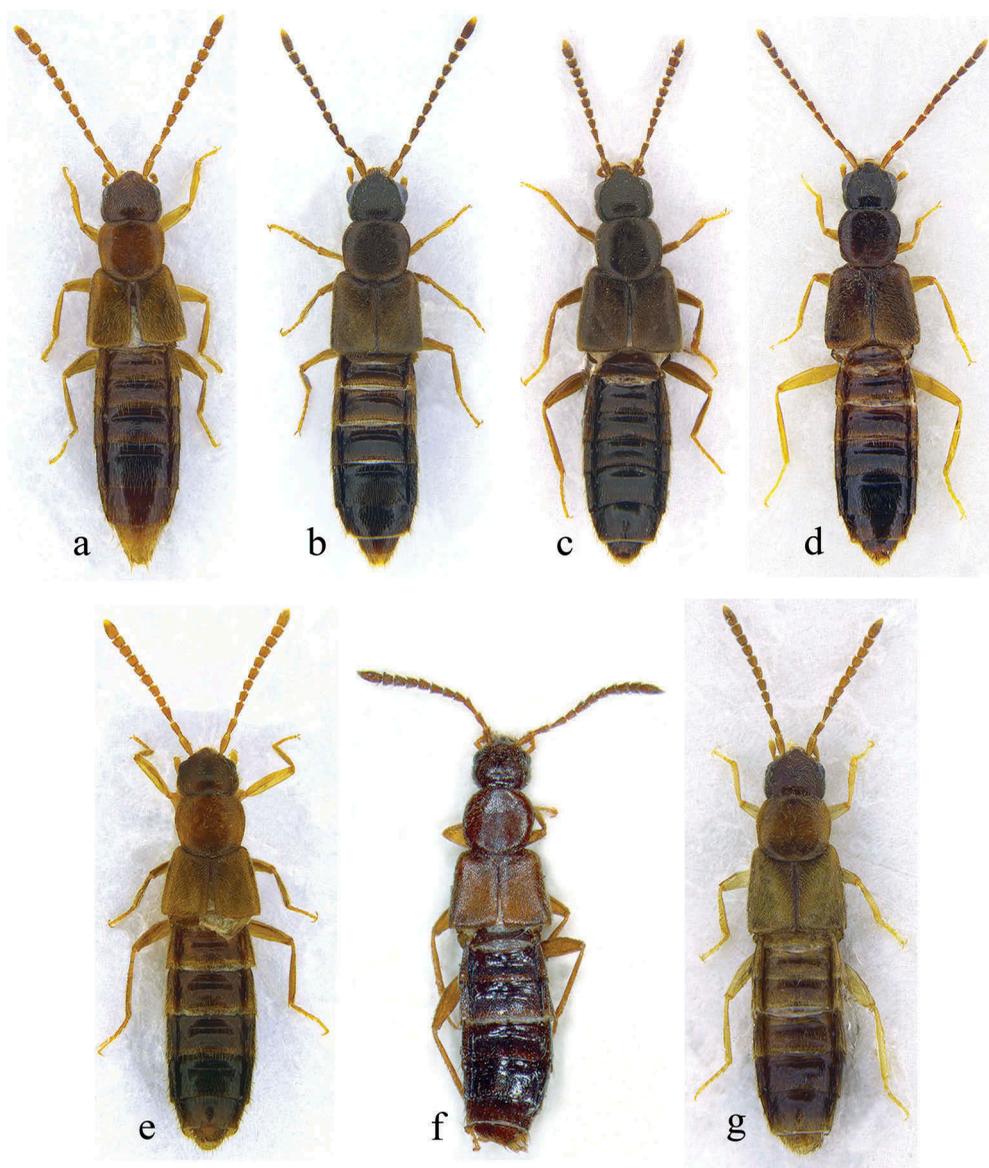
1. Body large, > 3.5 mm ..... 2
- Body small, < 3.5 mm ..... 3

2. Antennomeres 8–10 elongate ..... *A. elongata*  
 – Antennomeres 8–10 quadrate to subquadrate ..... *A. sulcifrons*
3. Body relatively convex, dark brown to black; pronotum (Figure 7(b)) longitudinally impressed in median region, pubescence directed posteriorly in midline .....  
 ..... *A. impressa* sp. nov.  
 – Body relatively flattened, reddish brown to dark brown; pronotum not impressed in median region, pubescence directed anteriorly in midline ..... 4
4. Antennomeres 8–10 slightly elongate (Figures 3(a) and 5(a)); abdominal tergites III–V with one pair of anterior macrosetae; male abdominal tergite VII (Figures 3(c) and 5(c)) without tubercle; posterior margin of male abdominal tergite VIII not modified (Figures 3(d) and 5(d)) ..... 5  
 – Antennomeres 8–10 transverse or quadrate (Figures 9(a) and 11(a)); abdominal tergites III–V with two pairs of anterior macrosetae; male abdominal tergite VII (Figures 9(c) and 11(c)) with tubercle; posterior margin of male abdominal tergite VIII modified (Figures 9(d) and 11(d)) ..... 6
5. Eyes small, slightly shorter than temples; antennomere 11 monocolour; labial palpi less elongate (Figure 2(f)); mesoventral process distinctly shorter than isthmus ..... *A. brunnea* sp. nov.  
 – Eyes large, distinctly longer than temples; antennomere 11 bicolour, paler at apex; labial palpi more elongate (Figure 4(f)); mesoventral process about as long as or longer than isthmus ..... *A. hydrosnectoides* sp. nov.
6. Eyes shorter than temples; male abdominal tergite VIII (Figure 9(d)) with two processes ..... *A. parviocularis* sp. nov.  
 – Eyes about as long as or slightly longer than temples; male abdominal tergite VIII (Figure 11(d)) with four processes ..... *A. tuberculata* sp. nov.

***Aloconota brunnea* Lee and Ahn sp. nov.**  
 (Figure 1(a), 2(a–f), 3(a–h))

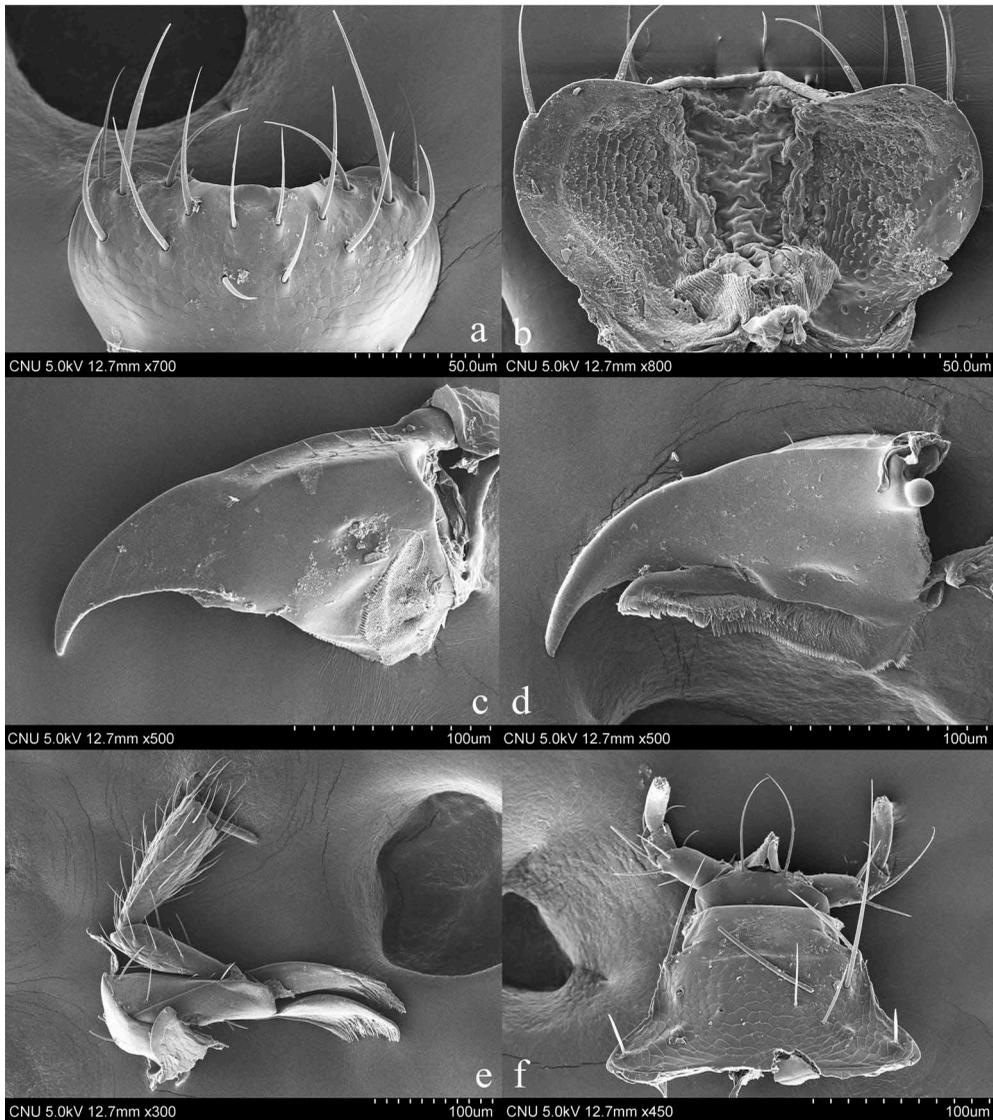
**Description**

Length 2.2–2.6 mm. Body (Figure 1(a)) surface fairly glossy and densely pubescent with fine microsculpture. Body brown; head and abdomen darker than other parts; legs paler brown. *Head*. Slightly elongate, approximately 1.1 times as long as wide, widest behind eyes, slightly narrower than pronotum; eyes small and slightly prominent, about 0.8–1.0 times as long as temples; gular sutures moderately separated, diverged basally; infraorbital carina absent; cervical carina complete. Antennae (Figure 3(a)) long and slender; antennomeres 1–3 elongate, 1 longest, 2 slightly longer than 3, 4–10 slightly elongate, 11 slightly shorter than preceding two combined. *Mouthparts*. Labrum (Figure 2(a)) transverse, emarginate in anterior margin, with  $\epsilon$ -sensillum and eight macrosetae on each side of midline; epipharynx (Figure 2(b)) with several sensilla, including two lateral sensory rows on each side of midline;  $\beta$ - and  $\gamma$ -sensilla very short, blunt at apex. Mandibles (Figure 2(c,d)) about 1.7 times as long as basal width; right one (Figure 2(c)) with internal tooth, internal margin slightly serrulate; prostheca



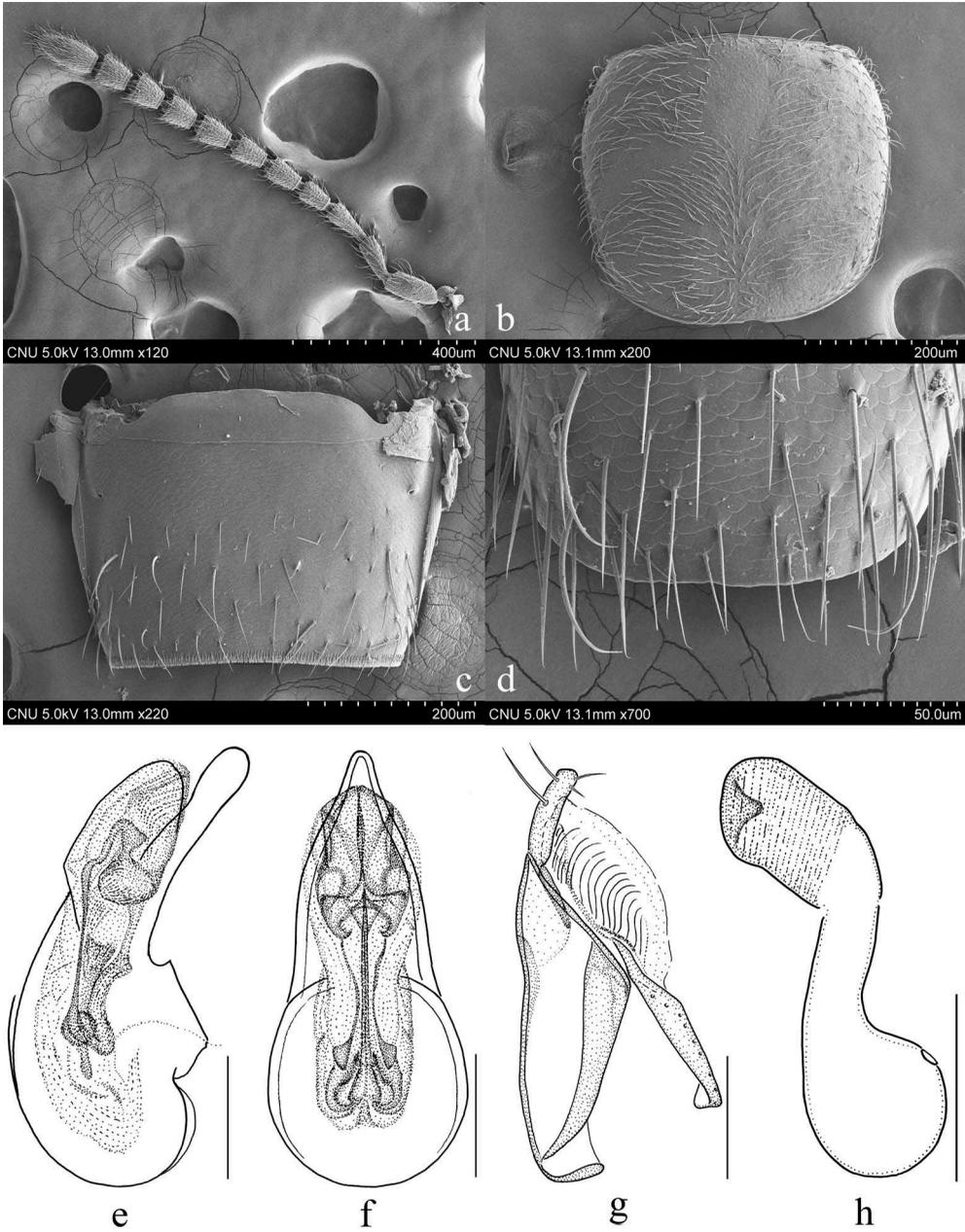
**Figure 1.** Habitus (a) *Aloconota brunnea* sp. nov., 2.3 mm; (b) *Aloconota elongata*, 4.0 mm; (c) *Aloconota hydrosmectoides*, 2.7 mm; (d) *Aloconota impressa* sp. nov., 3.0 mm; (e) *Aloconota parviocularis* sp. nov., 2.5 mm; (f) *Aloconota sulcifrons*, 4.5 mm; (g) *Aloconota tuberculata* sp. nov., 2.8 mm.

composed of three portions. Galea and lacinia of maxilla (Figure 2(e)) long and slender; lacinia composed of nine spines in distal comb region, isolated spines absent; maxillary palpomere 1 smallest and about 1.8–2.0 times as long as wide, 2 about 2.6–2.7 times as long as wide, 3 slightly longer than 2, about 2.4–2.5 times as long as wide, 4 digitiform, filamentous sensilla reaching to basal half. Prementum (Figure 2(f)) with two basal pores moderately separated, about 3.0–4.0 times width of basal pore; medial pseudopores, one setal pore and three or four real pores present on each side of midline; labial palpomere 1 largest, about 1.7–1.8 times as long as wide, with  $\gamma$ -setula close to b-seta, 2 shortest, about 1.3–1.5 times as long as wide, 3



**Figure 2.** Mouthparts of *Aloconota brunnea* sp. nov. (a) Labrum (dorsal aspect); (b) epipharynx (ventral aspect); (c) right mandible (dorsal aspect); (d) left mandible (ventral aspect); (e) left maxilla (ventral aspect); (f) labium (ventral aspect).

parallel-sided and about as long as 1, about 3.5–4.0 times as long as wide. Mentum (Figure 2 (f)) trapezoidal, anterior margin emarginate; v-seta short. *Thorax*. Pronotum (Figure 3(b)) subquadrate, approximately 1.1 times as wide as long, widest in apical fourth, narrow apically, pubescence directed anteriorly in midline; hypomera fully visible in lateral aspect. Metanotal scutum with one long seta and about two to four short setae on each side of midline. Mesocoxal cavities narrowly separated; mesoventral process distinctly pointed at apex, longer than metaventral process; isthmus longer than metaventral process; length ratio of mesoventral process, isthmus and metaventral process 7 : 6 : 2. Elytra slightly wider than pronotum; elytron approximately 1.6–1.7 times as long as wide, postero-lateral margin almost straight;



**Figure 3.** *Aloconota brunnea* sp. nov. (a) Antenna; (b) pronotum; (c) male abdominal tergite VII (dorsal aspect); (d) male abdominal tergite VIII (dorsal aspect); (e) median lobe of aedeagus (lateral aspect); (f) median lobe of aedeagus (ventral aspect); (g) paramere (lateral aspect); (h): spermatheca. Scales = 0.1 mm.

pubescence directed posteriorly and postero-laterally; hind wings fully developed, flabellum composed of about five or six setose lobes. *Legs.* Slender and long, with pubescence and macrosetae; tibiae with different length of two spurs at apex; tarsal formula 4-5-5, length ratio of tarsomeres 20 : 23 : 25 : 50 (protarsus); 28 : 30 : 30 : 26 : 45 (mesotarsus); 47 : 36 : 35 : 32 : 51

(metatarsus). *Abdomen*. Parallel-sided; surface glossy and densely pubescent, with transversely imbricate microsculpture; macrochaetal arrangement of tergites II–VI 01-12-12-12-13; male tergite VII (Figure 3(c)) without tubercles; male tergite VIII with four macrosetae on each side of midline, posterior margin (Figure 3(d)) subtruncate; male sternite VIII with seven macrosetae on each side of midline, posterior margin subtriangularly convex, with marginal setae; posterior margin of female tergite VIII subtruncate; female sternite VIII with six macrosetae on each side of midline, posterior margin round, with long marginal setae, minute setae present in median region. *Aedeagus*. Median lobe (Figure 3(e,f)) narrowly ovate, narrow and convergent apically in ventral aspect; apical process slightly bent in lateral aspect. Apical lobe of paramerites (Figure 3(g)) with four setae; a-seta longest, the other setae short and subequal in length, c- and d-setae positioned apically. *Spermatheca*. Bursa elongate, with conical-shaped umbilicus; duct short and simple, dilated and round apically (Figure 3(h)).

### **Type material**

Holotype, ♂, labelled as follows: 'KOREA: Gangwon Prov., Pyeongchang-gun, Jinbu-myeon, Dongsan-ri, Mt. Odaesan, Sangwonsa, N37°47.074' E128°33.735, 15 V 2006, T.-K. Kim, H.-W. Kim, ex near stream' (CNUIC). Paratypes, 4 exx., same data as holotype (CNUIC).

### **Material examined**

SOUTH KOREA: Chungbuk Prov.: 1 ♀, Yeongdong-gun, Mt Minjujisan, Mulhan-valley, 11 May 2003, SJ Park, DH Lee, sifting. Chungnam Prov.: 1 ex., Daejeon-si, Yuseong-gu, Gyesan-dong, Sutonggol, 6 April 2003, MS Choi, JS Park, near stream; 1 ex., Gongju-si, Banpo-myeon, Sangsin-ri, Mt Gyeryongsan, 21 May 2000, MS Kim, near stream; 12 exx. (in 95% ETOH), same data as former except for '5 VIII 2008, TK Kim, near stream'. Gangwon Prov.: 2 exx., Pyeongchang-gun, Jinbu-myeon, Dongsan-ri, Mt Odaesan, Sangwonsa, 20 April 2002, SJ Park, sifting; 3 exx., same data as former except for '26 April 2001, SJ Park, near stream'. Gyeongbuk Prov.: 5 exx. (two on slide), Cheongsong-gun, Cheongsong-eup, Wolo-ri, Mt Juwangsan, Dalgifalls, 36°26'31.9" N, 129°7'48.7" E, 15 June 2006, TK Kim, near stream under stones. Jeju Prov.: 3 exx. (one on slide), Seogwipo-si, Hawaon-dong, Seogwipo natural recreation forest, 33° 18'52.24" N, 126°27'56.04" E, 730 m, 7 September 2007, TK Kim, under stones near stream. Jeonbuk Prov.: 2 exx., Muju-gun, Seolcheon-myeon, 27 May 2005, JS Park, SI Lee, TK Kim, under stone. Jeonnam Prov.: 2 exx., Gwangju-si, Seokgok-dong, Mt Mudeungsan, Pungam-reservoir, 21 April 2006, KJ Ahn, near stream; 2 exx. (one on slide), same data as former except for 'TK Kim, HW Kim'; 2 exx., same data as former except for 'YH Kim'.

### **Distribution**

Korea (South).

### **Remarks**

This species is similar to *A. parviocularis* sp. nov., but can be distinguished by the characters provided in the key and different shape and structure of the aedeagus and spermatheca. Almost all specimens have been collected near stream with other *Aloconota* species.

### **Etymology**

Named derived from the Latin *brunnea* meaning 'brown', which refers to the body colour.

***Aloconota elongata*** Lee and Ahn, 2014  
(Figure 1(b))

*Aloconota elongata* Lee and Ahn, 2014: 1613–1619; Schülke and Smetana, 2015: 593.

**Description**

See Lee and Ahn (2014).

**Type material**

Holotype, ♂, labelled as follows: 'KOREA: Jeonnam Prov., Gurye-gun, Sandong-myeon, Mt. Jirisan, Simwon-fall, N35°19'24.8" E127°31'34.6" 850 m, 17 VI 2010, KJ Ahn, TK Kim, YH Kim, JG Lee, IS Yoo, JH Song, SG Lee, under stones near stream; HOLOTYPE, *Paraloconota koreana* Lee and Ahn, 2013' (CNUIC). Paratypes, 17 exx. (total): 5 exx., same data as holotype (CNUIC); 8 exx., 'KOREA: Chungnam Prov., Gongju-city, Gyeryong-myeon, Gyeryongsan, Gapsa, 19 VIII 2006, SJ Park, YH Kim, ex near stream' (CNUIC); 4 exx., 'KOREA: Gangwon Prov., Pyeongchang-gun, Jinbu-myeon, Dongsan-ri, Mt. Odaesan, Sangwonsa, N37°47.074' E128°33.735', 15 V 2006, T.-K. Kim, Y.-H. Kim, H.-W. Kim, ex near stream' (CNUIC).

**Material examined**

SOUTH KOREA: Chungnam Prov.: 3 exx., Geumsan-gun, Mt Daedunsan, 25 May 2001, SJ Park, MJ Jeon, HJ Yun, sifting. Gangwon Prov.: 2 exx., Hongcheon-gun, Naechon-myeon, Mt Baekamsan, KJ Ahn, CW Shin, JS Park, near stream; 2 exx. (in 95% ethanol), Inje-gun, Sangnam-myeon, Misan-ri, Mt Bangtaesan, 37°52'3.2" N, 128°22'9.6" E, 640 m, 24 June 2009, TK Kim, under stones near stream; 1 ex., Pyeongchang-gun, Jinbu-myeon, Mt Odaesan, Sangwonsa temple, 31 May 2008, TK Kim, under stone near stream; 13 exx., Yangyang-gun, Mt Seoraksan, Osaekyaksu, 31 July 2002, CW Shin, near stream; 4 exx., same data as former except for '22 vi 2002, JS Park'. Jeonnam Prov.: 2 exx., Damyang-gun, Yong-myeon, Wolgye-ri, Mt Chuwolsan, 7 June 2005, SM Choi, SI Lee, sifting; 4 exx. (in 95% ethanol), Haenam-gun, Samsan-myeon, Mt Duryunsan, TK Kim, under stones near stream; 5 exx. (in 95% ethanol), Gurye-gun, Sandong-myeon, Mt Jirisan, Simwon-fall, 35°19'24.8" N, 127°31'34.6" E, 850 m, 17 June 2010, KJ Ahn, JG Lee, TK Kim, IS Yoo, YH Kim, JH Song, SG Lee, leaf litters.

**Distribution**

Korea (South).

***Aloconota hydrosmectoides*** Lee and Ahn sp. nov.  
(Figure 1(c), 3(a–f), 4(a–h))

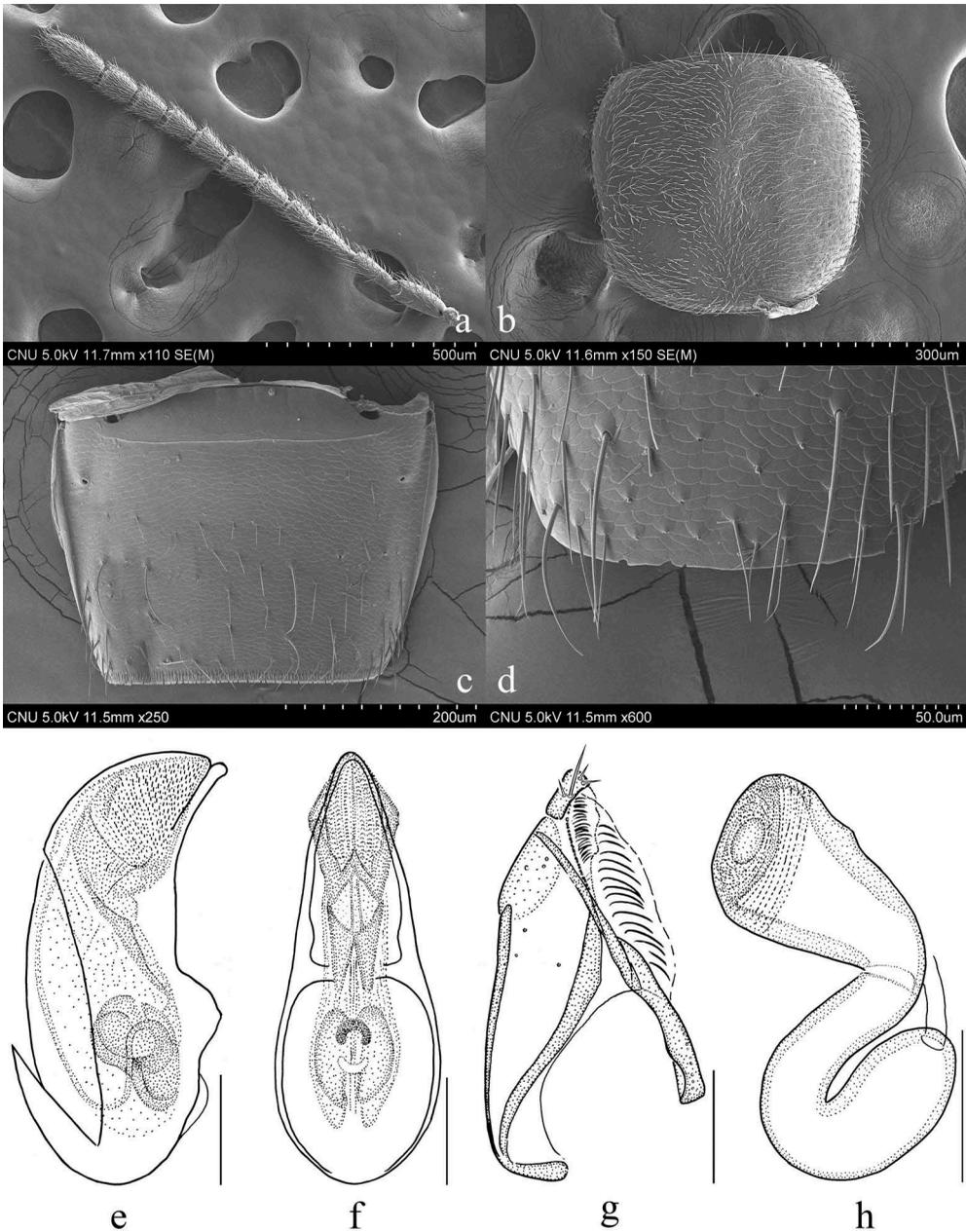
**Description**

Length 2.5 mm. Body (Figure 1(c)) surface glossy and densely pubescent with fine microsculpture. Body reddish brown to dark brown; antennomere 11 bicolour, paler at apex; head and abdominal segments V–VIII slightly darker than other parts; legs yellowish brown. *Head*..Quadrangle, approximately 1.0–1.1 times as long as wide,



**Figure 4.** Mouthparts of *Aloconota hydrosmectoides* sp. nov. (a) Labrum (dorsal aspect); (b) epipharynx (ventral aspect); (c) right mandible (dorsal aspect); (d) left mandible (ventral aspect); (e) left maxilla (ventral aspect); (f) labium (ventral aspect).

widest across eyes, about as wide as pronotum; eyes large and distinctly prominent, about 1.5–1.6 times as long as temples; gular sutures moderately separated, diverged basally; infraorbital carina absent; cervical carina complete. Antennae (Figure 5(a)) long and slender; antennomeres 1–3 elongate, 1 longest, 2 slightly longer than 3, 4–10 more or less dilated apically, 11 about as long as 1, slightly shorter than preceding two combined. *Mouthparts.* Labrum (Figure 4(a)) distinctly transverse, emarginate in anterior margin, with  $\epsilon$ -sensillum and eight macrosetae on each side of midline; epipharynx (Figure 4(b)) with several sensilla, including two lateral



**Figure 5.** *Aloconota hydrosmectoides* sp. nov. (a) Antenna; (b) pronotum; (c) male abdominal tergite VII (dorsal aspect); (d) male abdominal tergite VIII (dorsal aspect); (e) median lobe of aedeagus (lateral aspect); (f) median lobe of aedeagus (ventral aspect); (g) paramere (lateral aspect); (h) spermatheca. Scales = 0.1 mm.

sensory rows on each side of midline;  $\beta$ - and  $\gamma$ -sensilla very short. Mandibles (Figure 4(c,d)) about 1.7 times as long as basal width; right one (Figure 4(c)) with internal tooth, internal margin slightly serrulate; prostheca composed of three portions. Galea and lacinia of maxilla (Figure 4(e)) very long and slender; lacinia

composed of nine spines in distal comb region, isolated spines absent; maxillary palpomere 1 smallest, 2 about 3.0–3.2 times as long as wide, 3 slightly longer than 2, about 3.1–3.3 times as long as wide, 4 digitiform and relatively short, filamentous sensilla reaching to basal half. Prementum (Figure 4(f)) with two medial setae moderately widely separated; two basal pores moderately separated, about 3.0–4.0 times width of basal pore; several medial pseudopores, a few lateral pseudopores, one setal pore and about three or four real pores present on each side of midline; labial palpomere 1 largest, about 1.8–2.0 times as long as wide,  $\gamma$ -setula contiguous with b-seta, 2 shortest, about 1.4–1.6 times as long as wide, 3 parallel-sided and about as long as 1, about 3.0–3.5 times as long as wide. Mentum (Figure 4(f)) trapezoidal, anterior margin emarginate; v-seta short, closer to u-seta than w-seta. *Thorax*. Pronotum (Figure 5(b)) subquadrate, approximately 1.1 times as wide as long, widest in apical fourth, narrow apically, pubescence directed anteriorly in midline; hypomera fully visible in lateral aspect. Metanotal scutum with four to seven setae on each side of midline. Mesocoxal cavities narrowly separated; mesoventral process distinctly pointed at apex, shorter than isthmus and metaventral process combined; length ratio of mesoventral process, isthmus and metaventral process 13 : 7 : 9. Elytra slightly wider than pronotum; elytron approximately 1.6 times as long as wide, postero-lateral margin almost straight; pubescence directed posteriorly and postero-laterally; hind wings fully developed, flabellum composed of six or seven setose lobes. *Legs*. Slender and long, with pubescence and macrosetae; tibiae with different length of two spurs at apex; tarsal formula 4-5-5, length ratio of tarsomeres 24 : 25 : 27 : 63 (protarsus); 34 : 37 : 37 : 34 : 61 (mesotarsus); 55 : 46 : 45 : 42 : 69 (metatarsus); one empodial seta present. *Abdomen*. Parallel-sided; surface glossy and densely pubescent, with transversely imbricate microsculpture; macrochaetal arrangement of tergites II–VI 01-12-12-12-13; male tergite VII (Figure 5(c)) without tubercles; male tergite VIII with four macrosetae on each side of midline, posterior margin (Figure 5(d)) truncate; male sternite VIII with seven macrosetae on each side of midline, posterior margin subtriangularly convex, with long marginal setae; posterior margin of female tergite VIII similar to male's; female sternite VIII with six macrosetae on each side of midline, posterior margin similar to male's, with long and short marginal setae, minute setae present in median region. *Aedeagus*. Median lobe (Figure 5(e,f)) narrowly ovate, narrow and convergent apically in ventral aspect; apical process slightly bent in lateral aspect. Apical lobe of paramerites (Figure 5(g)) with four setae; a-seta longest, the other setae short and subequal in length, c- and d-setae positioned apically. *Spermatheca*. S-shaped; bursa large and dilated apically, with flat umbilicus; duct thick and recurved (Figure 5(h)).

### **Type material**

Holotype, ♂, labelled as follows: 'KOREA: Gyeongbuk Prov., Ulreung-gun, Seo-myeon, Namyang-ri, Namyang-stream, N37°28'33.36" E130°51'03.21" 101 m, 18 IX 2014, IS Yoo, JS Lee' (CNUIC). Paratypes, 27 exx. (total): 3 exx., same data as holotype (CNUIC); 18 exx., same data as former except for 'N37°27'58.04" E130°50'17.45"' (CNUIC); 6 exx., Daejeon-si, Dong-gu, Secheon-dong, Mt Sikjangsan, 36°19'29.27" N, 127°29'01.74" E, 103 m, 12 August 2014, IS Yoo, JS Lee, under fine sandy ground near stream (CNUIC).

### Remarks

This species is similar to *A. brunnea* sp. nov., but can be distinguished by the characters provided in the key and by the different shape and structure of the aedeagus and spermatheca. Most specimens have been collected near streams with other *Aloconota* species.

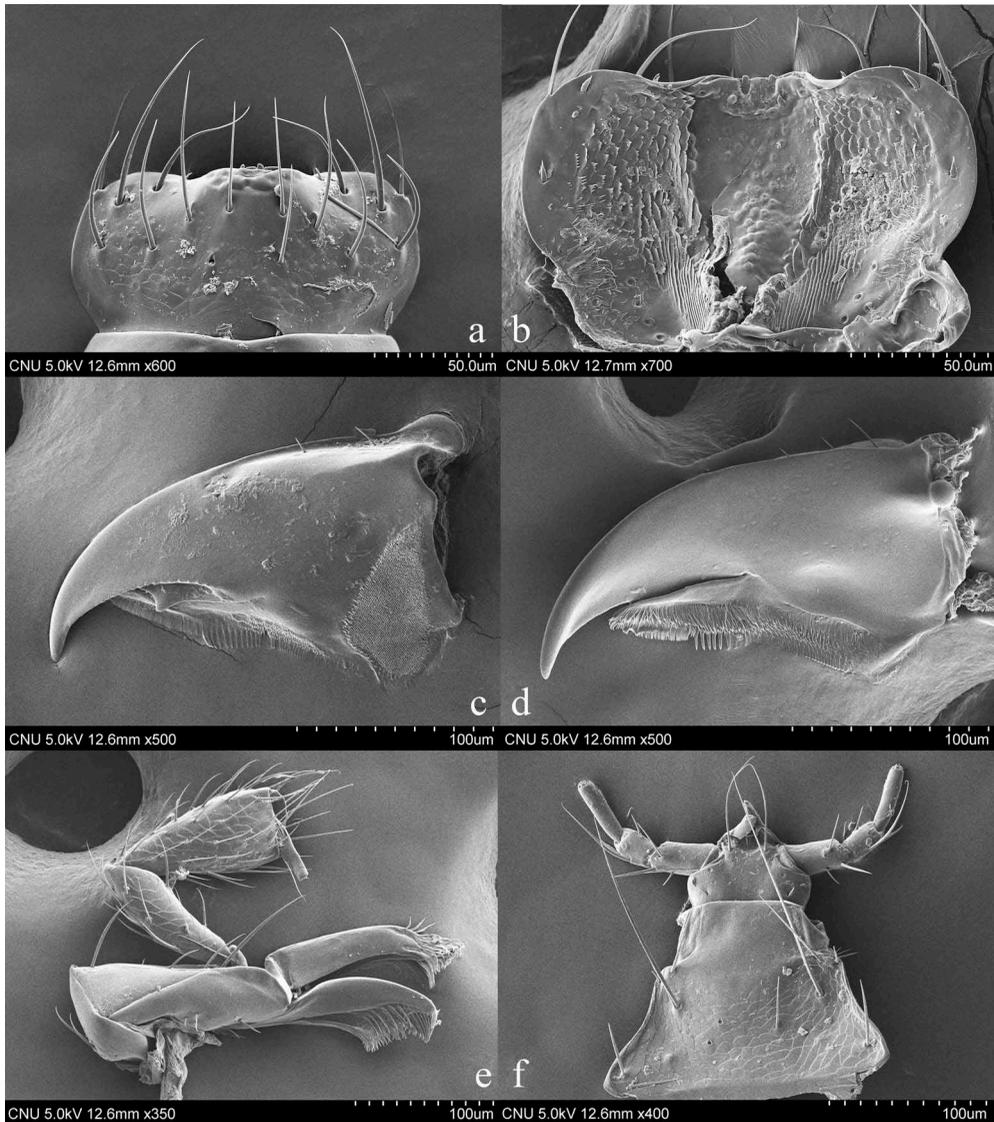
### Etymology

Name derived from the Greek *hydro* (water) + *smektes* (one who washes) + *oides* (resemblance).

### *Aloconota impressa* Lee and Ahn sp. nov. (Figure 1(d), 6(a–f), 7(a–h))

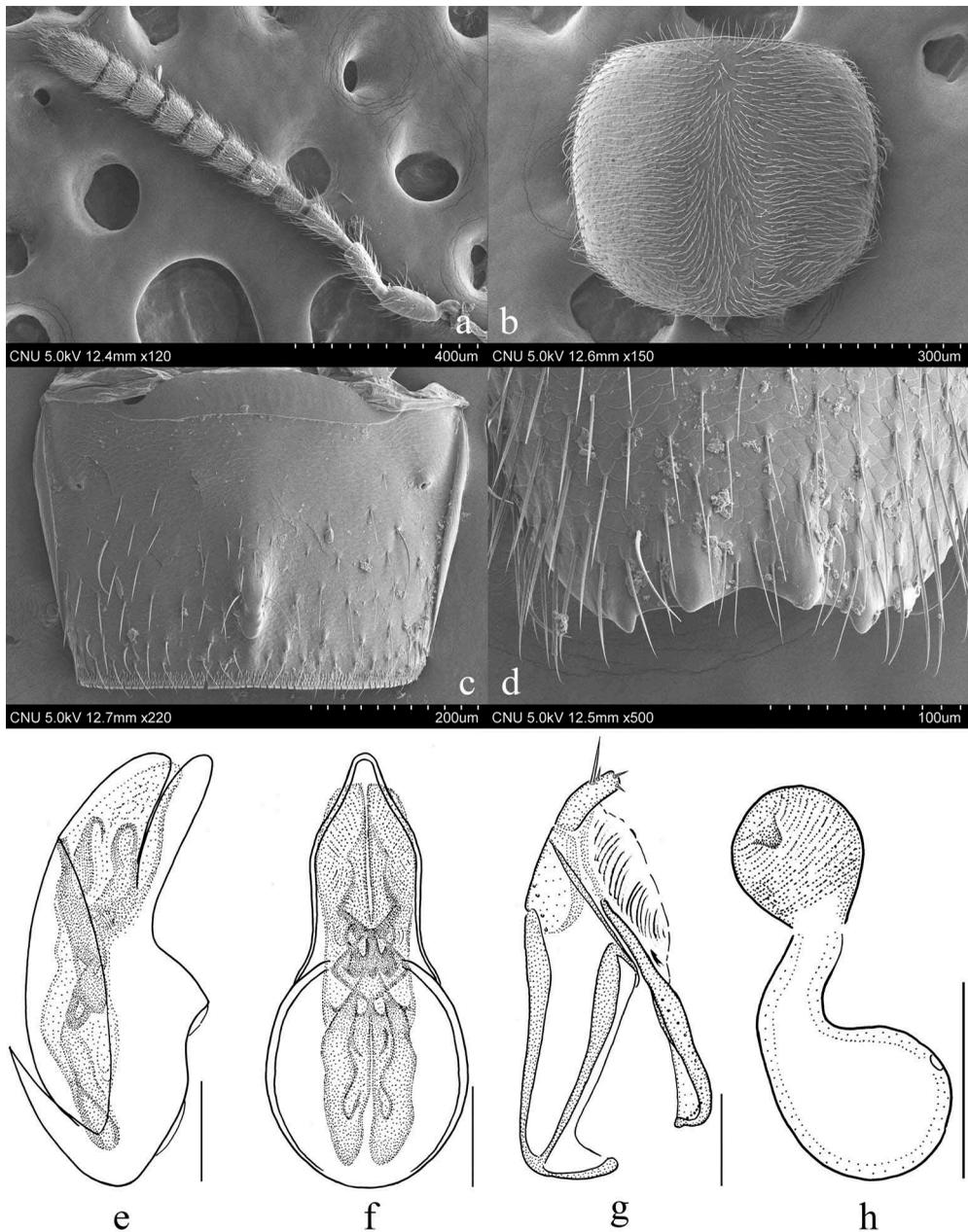
### Description

Length 2.3–3.2 mm. Body (Figure 1(d)) surface glossy and densely pubescent, with fine microsculpture. Body dark brown; legs slightly paler than other parts. *Head*. Quadrate, approximately 1.0–1.1 times as long as wide, widest across eyes, slightly narrower than pronotum; eyes slightly large and prominent, about 1.4–1.5 times as long as temples; gular sutures moderately separated, more or less diverged basally; infraorbital carina absent; cervical carina complete. Antennae (Figure 7(a)) long and slender, longer than head and pronotum combined; antennomeres 1–3 elongate, 1 longest, 2 longer than 3, 4 slightly elongate, 5–6 about as long as wide, 7–10 slightly transverse, 11 longer than wide, about as long as preceding two combined. *Mouthparts*. Labrum (Figure 6(a)) transverse, emarginate in anterior margin, with  $\epsilon$ -sensillum and eight macrosetae on each side of midline; epipharynx (Figure 6(b)) with several sensilla, including two lateral sensory rows on each side of midline;  $\beta$ - and  $\gamma$ -sensilla very short,  $\beta$ -sensillum blunt and  $\gamma$ -sensillum convergent apically. Mandibles (Figure 6(c,d)) about 1.6–1.7 times as long as basal width; right one (Figure 6(c)) with small internal tooth, internal margin serrulate; prosthema composed of three portions. Galea and lacinia of maxilla (Figure 6(e)) long and slender; lacinia composed of nine spines in distal comb region, isolated spines absent; maxillary palpomere 1 smallest and about 2.0 times as long as wide, 2 about 2.6–2.8 times as long as wide, 3 slightly longer than 2, about 2.4–2.5 times as long as wide, 4 digitiform, filamentous sensilla reaching to basal half. Prementum (Figure 6(f)) with two basal pores widely separated, about 4.0–5.0 times width of basal pore; medial pseudo-pores, one setal pore and three or four real pores present on each side of midline; labial palpomere 1 largest, about 1.6–1.7 times as long as wide, distance from setulae  $\alpha$  to  $\gamma$  about twice the distance from seta  $b$  to setula  $\gamma$ , 2 about 1.4–1.5 times as long as wide, 3 parallel-sided and about as long as 1, about 3.5–4.0 times as long as wide. Mentum (Figure 6(f)) trapezoidal, anterior margin emarginate;  $v$ -seta short. *Thorax*. Pronotum (Figure 7(b)) subquadrate, approximately 1.1 times as wide as long, widest in apical third; median region with longitudinal impression, pubescence directed posteriorly in midline; hypomera fully visible in lateral aspect. Metanotal scutum with one long seta and four or five short setae on each side of midline. Mesocoxal cavities moderately separated. Mesoventral process slightly pointed at apex, slightly shorter than metaven-tral process and isthmus combined. Elytra wider than pronotum; elytron approximately



**Figure 6.** Mouthparts of *Aloconota impressa* sp. nov. (a) Labrum (dorsal aspect); (b) epipharynx (ventral aspect); (c) right mandible (dorsal aspect); (d) left mandible (ventral aspect); (e) left maxilla (ventral aspect); (f), labium (ventral aspect).

1.7–1.8 times as long as wide, postero-lateral margin almost straight; pubescence directed posteriorly and postero-laterally; hind wings fully developed, flabellum composed of about eight setose lobes. *Legs.* Slender and long, with pubescence and macrosetae; tibiae with two spurs at apex; tarsal formula 4-5-5, length ratio of tarsomeres 30 : 33 : 33 : 72 (protarsus); 41 : 45 : 40 : 37 : 72 (mesotarsus); 60 : 45 : 45 : 42 : 90 (metatarsus). *Abdomen.* Parallel-sided; surface glossy and densely pubescent, with transversely imbricate microsculpture; macrochaetal arrangement of tergites II–VI 01-12-12-13-13; male tergite VII (Figure 7(c)) with longitudinal tubercle in postero-median region;



**Figure 7.** *Aloconota impressa* sp. nov. (a) Antenna; (b) pronotum; (c) male abdominal tergite VII (dorsal aspect); (d) male abdominal tergite VIII (dorsal aspect); (e) median lobe of aedeagus (lateral aspect); (f) median lobe of aedeagus (ventral aspect); (g) paramere (lateral aspect); (h) spermatheca. Scales = 0.1 mm.

VIII with four macrosetae on each side of midline, posterior margin (Figure 7(d)) emarginate in median region, with two inner processes and two outer processes blunt at apex; male sternite VIII with seven macrosetae on each side of midline, posterior margin convex, slightly round, with inconspicuous marginal setae; posterior margin of

female tergite VIII subtruncate, posterior margin of female sternite VIII broadly round, with long marginal setae, minute setae present in median region. *Aedeagus*. Median lobe (Figure 7(e,f)) narrowly ovate, apical process subparallel-sided, convergent apically in ventral aspect; apical process slightly bent in lateral aspect. Apical lobe of paramerites (Figure 7(g)) with four setae; a-seta longest, the other setae short and subequal in length, c- and d-setae positioned apically. *Spermatheca*. Bursa round, with small umbilicus; duct short and simple, dilated and round apically (Figure 7(h)).

### **Type material**

Holotype, ♂, labelled as follows: 'KOREA: Gangwon Prov., Pyeongchang-gun, Jinbu-myeon, Mt. Odaesan, N37°44'58.1" E128°34'44.9" 700m, 27 V 2010, TK Kim, flood debris' (CNUIC). Paratypes, 36 exx. (total): 20 exx., KOREA: Gangwon Prov., Hwacheon-gun Mt Hwaaksan, 30 June to 2 July 1998, HJ Lim, KL You, FIT (CNUIC); 1 ex., KOREA: Gangwon Prov., Hwacheon-gun Mt Hwaaksan, 30 June to 2 July 1998, HJ Lim, KL You, FIT (CNUIC); 10 exx., KOREA: Gangwon Prov., Hongcheron-gun, Nae-myeon, Gangwon-ri, Sambong-natural recreation forest, 37°51'0.1" N, 128°27'46" E, 11 May 2007, KJ Ahn, TK Kim, YH Kim, leaf litter (CNUIC); 2 exx., KOREA: Gangwon Prov., Inje-gun, Inje-eup, Mt Jeombongsan, 2 June 2006, SJ Park, YH Kim, near steam (CNUIC); 3 exx., KOREA: Gangwon Prov., Pyeongchang-gun, Jinbu-myeon, Dongsan-ri, Mt Odaesan, Sangwonsa, 37°47.074' N, 128°33.735' E, 15 May 2006, TK Kim, HW Kim, near stream (CNUIC);

### **Material examined**

SOUTH KOREA: Chungbuk Prov.: 1 ex., Jincheon-gun, Jincheon-eup, Baekgok-myeon, Mt Manloisan, 30 May 1998, HJ Lim, sifting; 3 exx., Yeongdong-gun, Sangchon-myeon, Mulhan-ri, Mt Minjujisan, Mulhan-valley, 36°3'15" N, 127°52'31" E, 15 June 2006, TK Kim, near stream; 5 exx. (in 95% ETOH), Yeongdong-gun, Yanggang-myeon, Jichon-ri, 12 April 2007, TK Kim, near stream. Chungnam Prov.: 9 exx., Daejeon-si, Secheon-dong, Secheon-park, 17 August 1999, HJ Kim, near stream; 2 exx., Daejeon-si, Mt Gyeryongsan, Sutonggol, 26 June 1999, HJ Kim, near stream; 2 exx., Daejeon-si, Sutonggol, 9 May 1998, KL You, HJ Lim, near stream; 5 exx., Daejeon-si, Yuseong-gu, Gyesan-dong, Gyeryongsan, Geumsubong, 21 May 2000, SJ Park, near stream; 3 exx., Geumsan-gun, Mt Daedunsan, 25 May 2001, SJ Park, MJ Jeon, HJ Yun, sifting; 4 exx., Gongju-si, Banpo-myeon, Sangsin-ri, Mt Gyeryongsan, 21 May 2000, MS Kim, near stream; 1 ex., Gongju-si, Mt Gyeryongsan, Sinwonsa, 17 July 2002, C Shin, near stream. Gangwon Prov.: 7 exx., Donghae-si, Samhwa-dong, Samhwasa, 26 May 1984, YS Kim; 2 exx. (in 95% ethanol), Jeongseon-gun, Jeongseon-eup, Mt Gariwangsan, 37°25'16" N, 128°33'23" E 585 m, 10 July 2009, YG Ban, leaf litter; 4 exx., Yangyang-gun, Seoraksan, Osaekyaksu, 31 July to 15 September 2001, SJ Park, CW Shin, JS Park, FIT; 5 exx., Yangyang-gun, Mt Seoraksan, Osaekyaksu, 31 July to 15 September 2002, SJ Park, CW Shin, JS Park, FIT; 3 exx., Yanggu-gun, Yanggu-eup, Mt Samyeongsan, 38.07005 N, 127.93498 E, 14 July to 12 August 2003, SJ Park, DH Lee, FIT. Gyeongbuk Prov.: 20 exx., Bonghwa-gun Mt Cheongryangsang, 128°53'53" N, 36°46'37" E, 30 July 2007, KJ Ahn, DH Lee, HW Kim, JH Song, leaf litter; 8 exx., Cheongsong-gun, Budong-myeon, Sangui-ri, Mt Juwangsan, 13 June 2006, SJ Park, YH Kim, near stream; 6 exx., Cheongsong-gun, Mt Juwangsan, 28–29 June 1987, YB Cho; 12 exx., Cheongsong-gun, Cheongsong-eup, Wolo-ri, Mt Juwangsan, Dalgi-falls, 36°26'31.9" N, 129°7'48.7" E, 15 June 2006, TK Kim, under stones near stream; 6 exx., Cheongsong-gun,

Mt Juwangsan, 23 June 1988, GS Jang; 28 exx., Ulleung-gun, Seo-myeon, Namyang stream, 37°27'58.04" N, 130°50'17.45" E, 0 m, 18 September 2001, IS Yoo, JS Lee, near stream. Gyeonggi Prov.: 4 exx., Gapyeong-gun, Buk-myeon, Mt Myeongjisan, 25 July to 30 August 2001, KJ Ahn, SJ Park, CW Shin, FIT; 2 exx., Namyangju-si, Sundog-myeon, Obang-ri, Mt Chukryeongsan, 13 September 1999, HJ Kim, near stream; 1 ex., Yangpyeong-gun, Mt Yongmunsan, 3 July 1998, KL You, HJ Lim, FIT. Jeju Prov.: 1 ex., Jeju-si, Ara-dong, Gwaneumsa, 26 May 2003, SJ Park, near stream; 1 ex., Jeju-si, Jocheon-eup, Goepyeongioreum, 28 May to 27 June 2003, SJ Park, CW shin, FIT; 21 exx., Seogwipo-si, Mt Hallasan, Yeongsil, 17 June 2003, SJ Park, sifting; 9 exx., Seogwipo-si, Hawon-dong, Seogwipo-natural recreation forest, 33°18'54.2" N, 126°27'56.0" E, 735 m, 30 May 2007, KJ Ahn, DH Lee, TK Kim, YH Kim, flood debris; 1 ex., Seogwipo-si, Hawaon-dong, Seogwipo natural recreation forest, 33°18'52.24" N, 126°27'56.04" E, 730 m, 7 September 2007, TK Kim, under stones near stream. Jeonbuk Prov.: 8 exx., Jeongeup-si, Mt Naejangsan, Naejangsa, Geumseon-valley, 25 June 2000, HJ Kim, near stream; 3 exx., Muju-gun, Anseong-eup, Chilyeon fall, 6 June 1988, GS Jang; 3 exx. (in 95% ethanol), Muju-gun, Seolcheon-myeon, Mt Deokyusan, 27 June 2005, JS Park, SI Lee, TK Kim, under stones; 8 exx., Muju-gun, Seolcheon-myeon, Samgong-ri, Baekryeonsa, 35°52.358' N, 127°46.572' E, 29 June 2006, SI Lee, TK Kim, under stones; 4 exx., same data as former except for 29 June 2006, KJ Ahn, TK Kim, near stream. Jeonnam Prov.: 3 exx., Damyang-gun, Yong-myeon, Wolgye-ri, Mt Chuwolsan, 7 April 2005, SM Choi, SI Lee, sifting; 1 ex., Gwangyang-si, Daab-myeon, 25 May 2000, KJ Ahn; 5 exx., Gwangju-si, Seokgok-dong, Mt Mudeungsan, Pungam-reservoir, 21 April 2006, KJ Ahn, near stream.

### **Distribution**

Korea (South).

### **Remarks**

This species can be distinguished from other *Aloconota* species by the more convex and subparallel-sided body; the pronotum with longitudinal impression in median region; and the different shape and structure of aedeagus and spermatheca. Most specimens have been collected near stream with other *Aloconota* species.

### **Etymology**

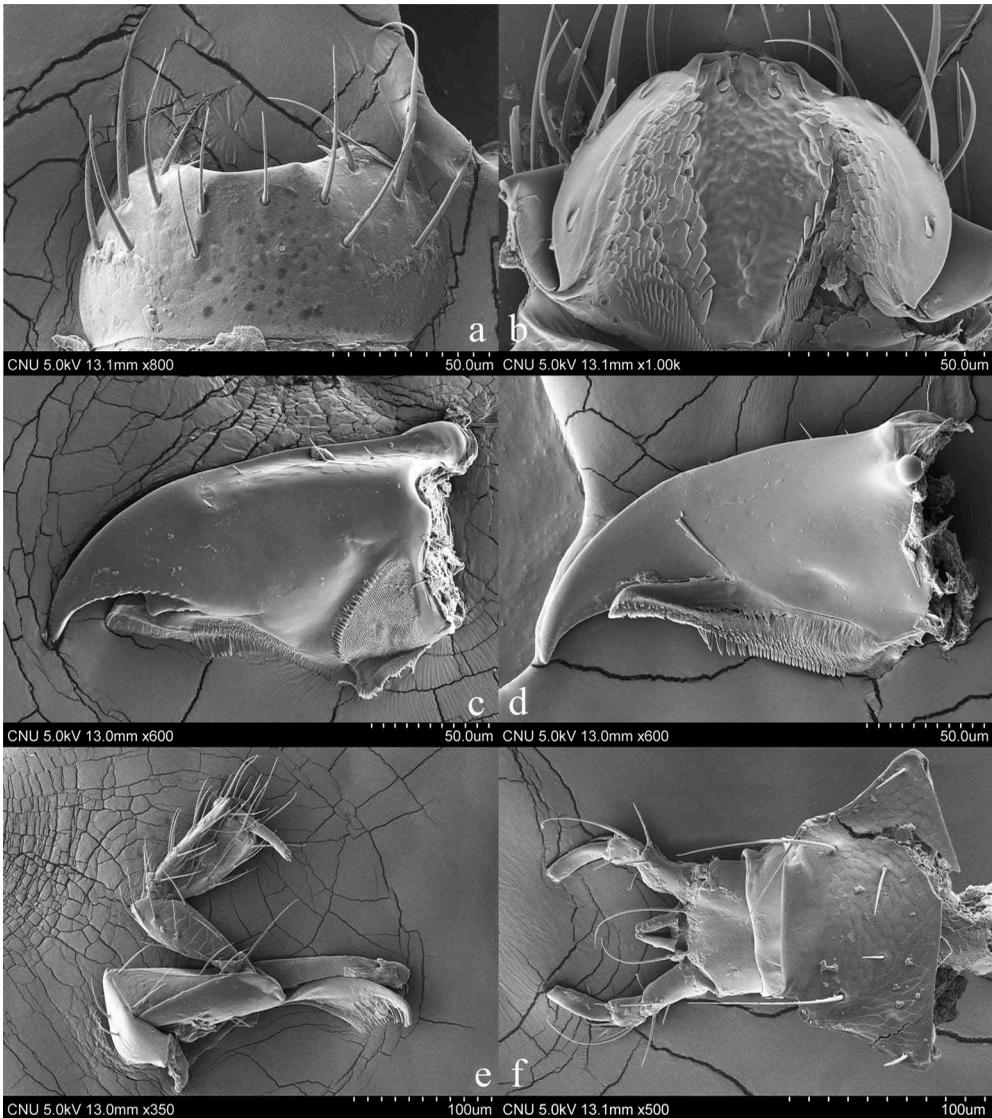
Named derived from the Latin *impressa* meaning 'impression', which is located on dorsal surface of pronotum.

### ***Aloconota parviocularis* Lee and Ahn sp. nov.**

(Figure 1(e), 8(a–f), 9(a))

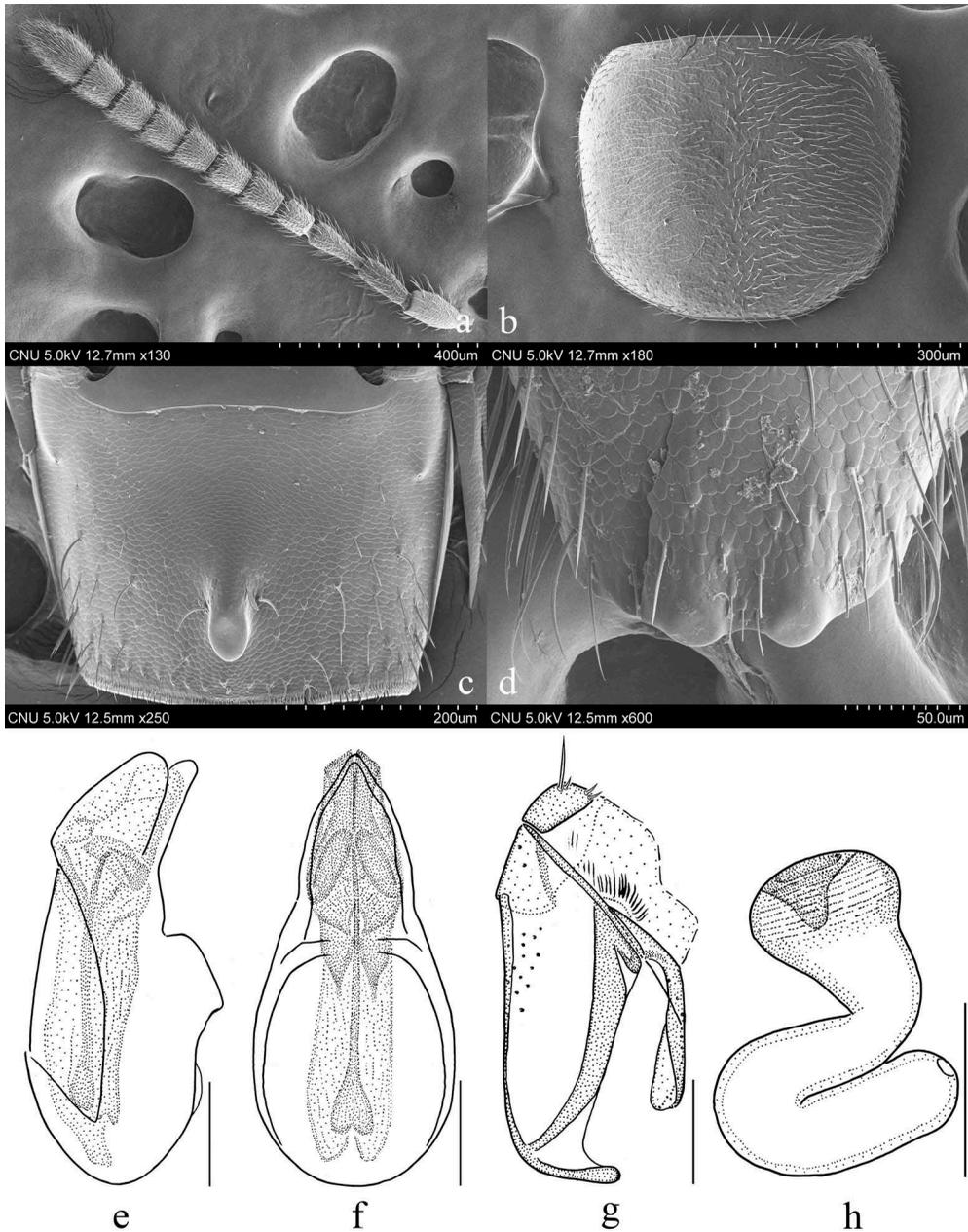
### **Description**

Length 2.3–2.7 mm. Body (Figure 1(e)) surface slightly glossy and densely pubescent with microsculpture. Body brown to dark brown; head and abdominal segments VI–VIII darker than other regions; legs yellowish brown. *Head*. Slightly elongate, approximately 1.1 times as long as wide, widest behind eyes, slightly narrower than pronotum; eyes small and slightly prominent, about 0.8 times as long as temples; gular sutures moderately separated,



**Figure 8.** Mouthparts of *Aloconota parviocularis* sp. nov. (a) Labrum (dorsal aspect); (b) epipharynx (ventral aspect); (c) right mandible (dorsal aspect); (d) left mandible (ventral aspect); (e) left maxilla (ventral aspect); (f) labium (ventral aspect).

diverged basally; infraorbital carina absent; cervical carina incomplete. Antennae (Figure 9 (a)) long and slender; antennomeres 1–3 elongate, 1 longest, 2 longer than 3, 4–8 slightly elongate, 9–10 about as long as wide, 11 shorter than preceding two combined. *Mouthparts*. Labrum (Figure 8(a)) transverse, emarginate in anterior margin, with  $\epsilon$ -sensillum and eight macrosetae on each side of midline; epipharynx (Figure 8(b)) with several sensilla, including two lateral sensory rows on each side of midline;  $\alpha$ -sensillum completely reduced,  $\beta$ - and  $\gamma$ -sensilla very short, blunt at apex. Mandibles (Figure 8(c,d)) about 1.7 times as long as basal width; right one (Figure 8(c)) with small internal tooth, internal margin slightly serrulate;



**Figure 9.** *Aloconota parviocularis* sp. nov. (a) Antenna; (b) pronotum; (c) male abdominal tergite VII (dorsal aspect); (d) male abdominal tergite VIII (dorsal aspect); (e) median lobe of aedeagus (lateral aspect); (f) median lobe of aedeagus (ventral aspect); (g) paramere (lateral aspect); (h) spermatheca. Scales = 0.1 mm.

prostheca composed of three portions. Galea of maxilla (Figure 8(e)) elongate and decurved, about as long as stipes, filiform setae present on apex; lacinia composed of nine spines in distal comb region, isolated spines absent; maxillary palpomere 1 smallest and about 2.0

times as long as wide, 2 about 3.0 times as long as wide, 3 slightly longer than 2, about 2.8–3.0 times as long as wide, 4 digitiform, filamentous sensilla not reaching to basal half. Prementum (Figure 8(f)) with two basal pores separated, about 4.0–5.0 times width of basal pore; medial pseudopores, one setal pore and three or four real pores present on each side of midline; labial palpomere 1 largest, about 1.8 times as long as wide, with  $\gamma$ -setula located between  $\alpha$ -setula and b-seta, distance from setula  $\alpha$  to  $\gamma$  subequal to distance from seta b to setula  $\gamma$ , 2 shortest, about 1.7–1.8 times as long as wide, 3 parallel-sided and about as long as 1, about 3.5–4.0 times as long as wide. Mentum (Figure 8(f)) trapezoidal, anterior margin emarginate; v-seta very short. *Thorax*. Pronotum (Figure 9(b)) subquadrate, approximately 1.1 times as wide as long, widest in apical third, narrow apically, pubescence directed anterior and anteriorly in midline; hypomera fully visible in lateral aspect. Metanotal scutum with one long seta and about five to seven short setae on each side of midline. Mesoventral process pointed at apex, longer than metaventral process; isthmus longer than metaventral process; length ratio of mesoventral process, isthmus and metaventral process about 6 : 5 : 2. Elytra slightly longer and wider than pronotum; elytron approximately 1.7–1.8 times as long as wide, pubescence directed postero-laterally; postero-lateral margin almost straight; hind wings fully developed, flabellum composed of about five to seven setose lobes. *Legs*. Slender and long, with pubescence and macrosetae; tibiae with two spurs at apex; tarsal formula 4-5-5, length ratio of tarsomeres 23 : 29 : 29 : 72 (protarsus); 35 : 35 : 35 : 32 : 69 (mesotarsus); 57 : 44 : 42 : 40 : 80 (metatarsus). *Abdomen*. Parallel-sided; surface glossy and densely pubescent, with imbricate microsculpture; macrochaetal arrangement of tergites II–VI 01-21-21-21-13; male tergite VII (Figure 9(c)) with longitudinal tubercles in postero-median region, VIII with four macrosetae on each side of midline, posterior margin (Figure 9(d)) with two round processes at middle; male sternite VIII with seven macrosetae on each side of midline, posterior margin convex, slightly round, with long marginal setae; posterior margin of female tergite VIII broadly round; posterior margin of female sternite VIII broadly round, with long marginal setae, minute setae present in median region. *Aedeagus*. Median lobe (Figure 9(e,f)) narrowly ovate, apical process narrow and pointed apically in ventral aspect; apical process slightly bent in lateral aspect. Apical lobe of paramerites (Figure 9(g)) with four setae; a-seta longest, the other setae short and subequal in length, c- and d-setae positioned apically. *Spermatheca*. S-shaped; bursa large, with large and conical-shaped umbilicus; duct thick (Figure 9(h)).

### **Type material**

Holotype, ♂, labelled as follows: 'KOREA: Gyeongnam Prov., Hamyang-gun, Macheon-myeon, Mt. Jirisan, Yongso-valley, N35°23'03.4"E127°41'53.2" 410m, 14 VI 2010, KJ Ahn, JG Lee, TK Kim, IS Yoo, YH Kim, JH Song, SG Lee, flood debris' (CNUIC). Paratypes, 7 exx. (total): 4 exx., 'KOREA: Gangwon Prov., Hongcheron-gun, Nae-myeon, Gangwon-ri, Sambong Natural Recreation Forest, N37x., 'KOR E128°27'46", 11 V 2007, KJ Ahn, TK Kim, YH Kim, ex leaf litter' (CNUIC); 3 exx., 'KOREA: Chungnam Prov., Geumsan-gun, Mt. Daedunsan, 25 V 2001, S.-J. Park, M.-J. Jeon, H.-J. Yun, ex sifting' (CNUIC).

### **Material examined**

SOUTH KOREA: Chungnam Prov.: 3 exx., Geumsan-gun, Mt Daedunsan, 24 May 2001, SJ Park, MJ Jeon, HJ Yun, sifting; 3 exx., same data as former except for '21 v 2001 SJ Park'; 1 ex., Gongju-si, Gyeryongsan, Gapsa, 19 August 2006, SJ Park, YH Kim, near

stream. Gangwon Prov.: 5 exx. (in 95% ethanol), Chuncheon-si, Gajeong-dong, Mt Bonghwasan, 17 September 2008, TK Kim, near stream; 2 exx. (in 95% ethanol), Inje-gun, Sangnam-myeon, Misan-ri Mt Bangtaesan, 37°52'3.2" N, 128°22'9.6" E, 640 m, 24 June 2009, TK Kim, under stones near stream; 1 ex. (in 95% ethanol), Pyeongchang-gun, Jinbu-myeon, Mt Odaesan, Sangwonsa, 31 May 2008, TK Kim, under stone near stream; 37°47.074' N, 128°33.735' E, 15 May 2006, TK Kim, HW Kim, near stream; 1 ex., same data as former except for '31 v 2008, N37°47.074' E128°33.735', 15 v 2006, TK Kim, HW Kim, near stream'; 1 ex., Taebaek-si, So-dong, Mt Taebaeksan, 37°6'52" N, 128°56'51.1"E, 3 September 2006, SJ Park, TK Kim, under stones. Gyeongbuk Prov.: 1 ex., Bonghwa-gun Mt Cheongryangsan, 36°46'37" N, 128°53'53" E, 30 July 2007, KJ Ahn, DH Lee, HW Kim, JH Song, leaf litter; 1 ex., Cheongsong-gun, Budong-myeon, Sangui-ri, Mt Juwangsan, 13 June 2006, SJ Park, YH Kim, near stream. Gyeongnam Prov.: 3 exx. (in 95% ethanol), Hamyang-gun, Macheon-myeon, Mt Jirisan, Hongdae-fall, 35°20'44.2" N, 127°40'59.7" E, 740 m, 15 June 2010, JH Song, SG Lee, leaf litter. Jeonnam Prov.: 8 exx., Gurye-gun, Sandong-myeon, Mt Jirisan, Simwon-fall, 35°19'24.8" N, 127°31'34.6" E, 850 m, 17 June 2010, KJ Ahn, JG Lee, TK Kim, IS Yoo, YH Kim, JH Song, SG Lee, leaf litters; 1 ex., Gwangju-si, Seokgok-dong, Mt Mudeungsan, Pungam-reservoir, 21 April 2006, KJ Ahn, near stream.

### **Distribution**

Korea (South).

### **Remarks**

This species is similar to *A. tuberculata* sp. nov., but can be distinguished by the characters provided in the key and different shape and structure of the aedeagus and spermatheca.

### **Etymology**

Named derived from the Latin *parviocularis* meaning 'small eye'.

### ***Aloconota sulcifrons* (Stephens 1832)**

(Figure 1(f))

*Aleochara sulcifrons* Stephens, 1832: 121.

*Homalota pavens* Erichson, 1839b: 689.

*Calodera diluta* Hampe, 1850: 347.

*Homalota obliquepunctata* Wollaston, 1854: 549.

*Homalota lissonura* Thomson, 1856: 92.

*Disopora solida* Mulsant and Rey, 1875: 225.

*Atheta laurentiana* Blatchley, 1910: 357

*Atheta (Aloconota) sulcifrons*: Benick, 1954: 139; Palm, 1970: 155; Moore and Legner, 1975: 375; Benick and Lohse, 1974: 96.

*Atheta bolsonensis* Scheerpeltz, 1972: 157.

*Aloconota insecta*: Klimaszewski and Peck, 1986: 65 (misidentification).

*Aloconota sulcifrons*: Paśnik, 2001: 196.

*Aloconota (Aloconota) sulcifrons*: Smetana, 2004: 369.

*Aloconota (Aloconota) sulcifrons*: Schülke and Smetana, 2015: 592.

### Description

See Klimaszewski and Peck (1986)

### Material examined

Syntypes. 1 ex., labelled as follows: '5357, pavens Er. Berol. sulcifrons Stephen. Eroup. temp. Berol.' deposited in the MNHB. NORTH KOREA: 3 exx., Corea spet. 1983 Myohyangsan Mts. Exp. Inst.Zool.Cr. [North Korea, Pyeonganbuk Prov., Mt. Myohyangsan, 1983, ISEA]; 2♂♂, Korea 25.5.1974 Jonghen and Džuyr Exp. Inst.Zool.Cr. [North Korea, Hamgyeongbuk Prov., Gyeongseong-gun, Yonghyeon-ri, 25 v 1974, ISEA].

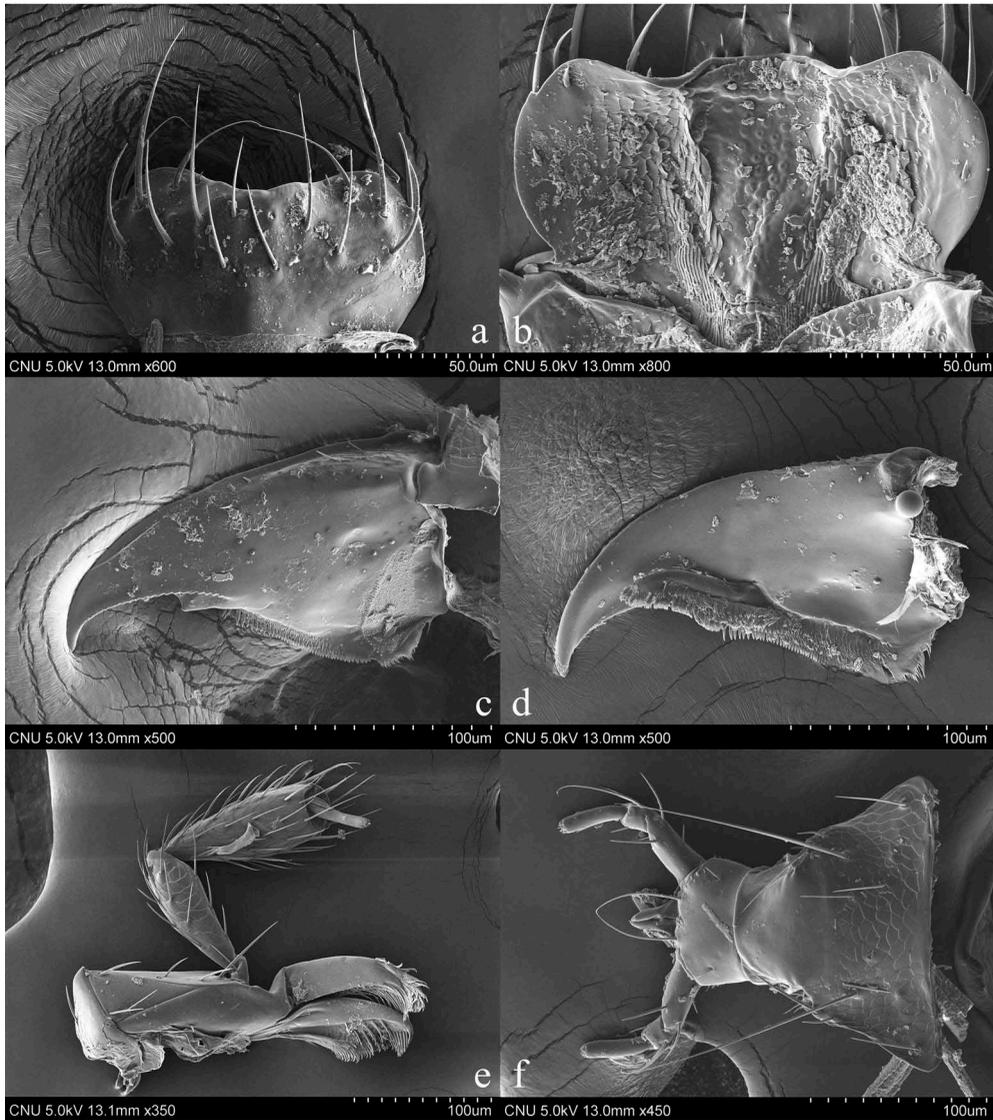
### Distribution

Korea (North), China (Gansu), Russia (East Siberia) and Cosmopolitan.

### *Aloconota tuberculata* Lee and Ahn sp. nov. (Figure 1(g), 10(a–f), 11(a–h))

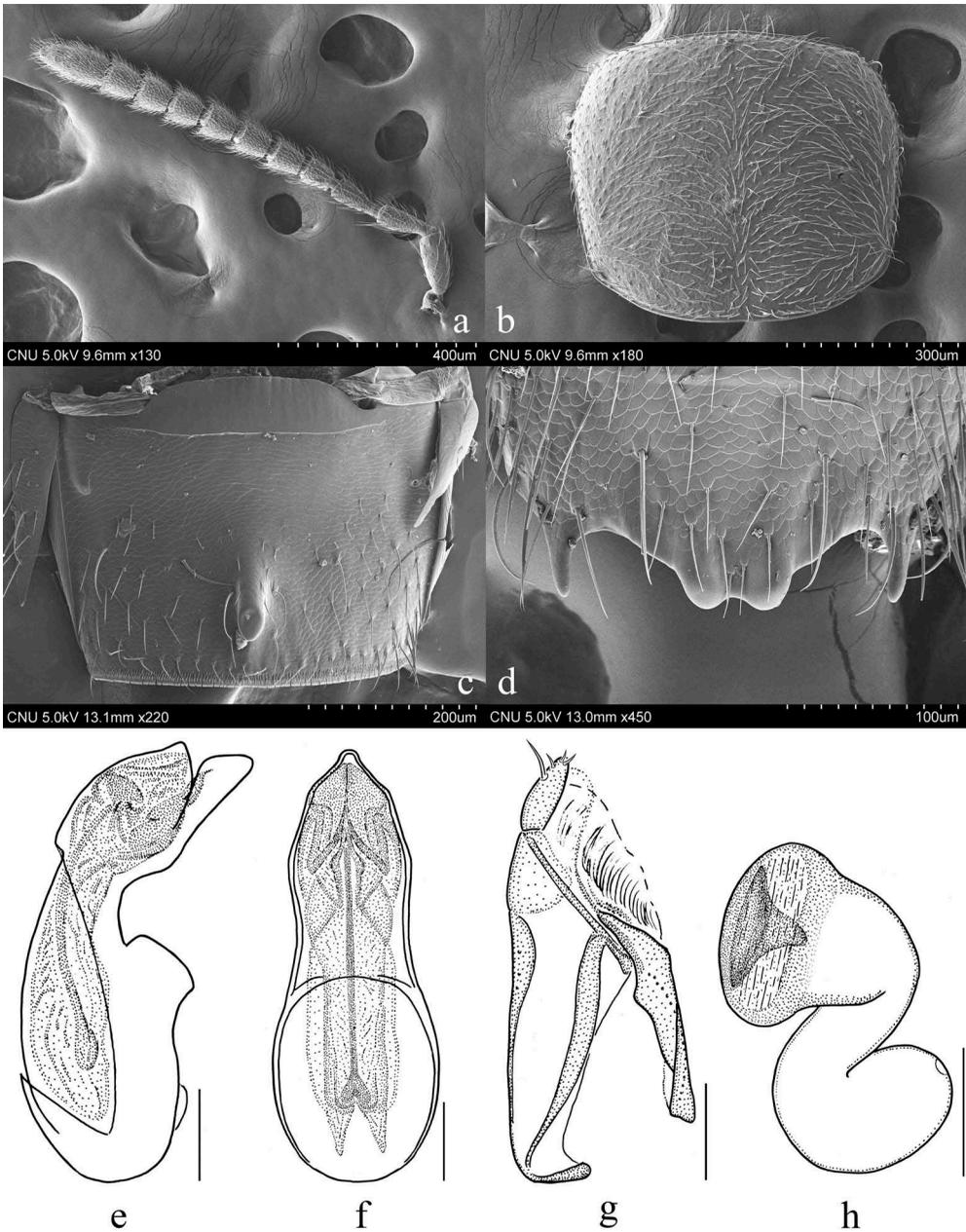
### Description

Length 2.4–3.0 mm. Body (Figure 1(g)) surface slightly glossy and densely pubescent, with microsculpture. Body reddish brown to dark brown; head and abdomen slightly darker than antennae, pronotum and elytra; legs slightly paler than other parts. *Head*. Slightly elongate, approximately 1.1 times as long as wide, widest across eyes, slightly narrower than pronotum; eyes moderate in size and prominent, about 1.0–1.2 times as long as temples; gular sutures moderately separated, more or less diverged basally; infraorbital carina absent; cervical carina complete. Antennae (Figure 11(a)) long and slender; antennomeres 1–3 elongate, 1 longest, 2 slightly longer than 3, 4–6 about as long as wide, 7–10 slightly transverse, 11 longer than wide, about as long as preceding two combined. *Mouthparts*. Labrum (Figure 10(a)) transverse, emarginate in anterior margin, with  $\epsilon$ -sensillum and eight macrosetae on each side of midline; epipharynx (Figure 10(b)) with several sensilla, including two lateral sensory rows on each side of midline;  $\beta$ - and  $\gamma$ -sensilla very short. Mandibles (Figure 10(c,d)) about 1.7 times as long as basal width; right one with small internal tooth, internal margin serrulate; prosthema distinctly composed of three portions. Galea and lacinia of maxilla (Figure 10(e)) long and slender; lacinia composed of nine spines in distal comb region, isolated spines absent; maxillary palpomere 1 smallest, 2 about 2.7–2.8 times as long as wide, 3 slightly longer than 2, about 2.5–2.7 times as long as wide, 4 digitiform, filamentous sensilla not reaching to basal half. Prementum (Figure 10(f)) with two basal pores widely separated, about 5.0 times width of basal pore; medial pseudopores, one setal pore and three real pores present on each side of midline; labial palpomere 1 largest, about 1.5–1.7 times as long as wide, with  $\gamma$ -setula located between  $\alpha$ -setula and  $b$ -seta, distance from setulae  $\alpha$  to  $\gamma$  almost twice distance from seta  $b$  to setula  $\gamma$ , 2 shortest, about 1.6–1.8 times as long as wide, 3 parallel-sided and about as long as 1, about 3.5–4.0 times as long as wide. Mentum (Figure 10(f)) trapezoidal, anterior margin emarginate;  $v$ -seta relatively long. *Thorax*. Pronotum (Figure 11(b)) subquadrate, approximately 1.1–1.2 times as wide as long, widest in apical third; pubescence directed anteriorly in midline; hypomera fully visible in lateral aspect. Metanotal scutum with one long seta and about three to five short setae on each side of midline. Mesocoxal cavities narrowly separated, mesoventral process distinctly



**Figure 10.** Mouthparts of *Aloconota tuberculata* sp. nov.. (a) Labrum (dorsal aspect); (b) epipharynx (ventral aspect); (c) right mandible (dorsal aspect); (d) left mandible (ventral aspect); (e) left maxilla (ventral aspect); (f) labium (ventral aspect).

pointed at apex, shorter than isthmus and metaventral process combined. Elytra slightly longer and wider than pronotum; elytron approximately 1.7 times as long as wide, pubescence directed posteriorly and postero-laterally; postero-lateral margin almost straight; hind wings fully developed, flabellum composed of about seven setose lobes. *Legs*. Slender and long, with pubescence and macrosetae; tibiae with two spurs at apex; tarsal formula 4-5-5, length ratio of tarsomeres 25 : 29 : 31 : 69 (protarsus); 31 : 34 : 36 : 32 : 63 (mesotarsus); 57 : 47 : 44 : 43 : 72 (metatarsus) (mm,  $\times 400$ ). *Abdomen*. Parallel-sided; surface glossy and densely pubescent, with transversely imbricate microsculpture; macrochaetal arrangement



**Figure 11.** *Aloconota tuberculata* sp. nov. (a) Antenna; (b) pronotum; (c) male abdominal tergite VII (dorsal aspect); (d) male abdominal tergite VIII (dorsal aspect); (e) median lobe of aedeagus (lateral aspect); (f) median lobe of aedeagus (ventral aspect); (g) paramere (lateral aspect); (h) spermatheca. Scales = 0.1 mm.

of tergites II–VI 01-21-21-21-23; male tergite VII (Figure 11(c)) with longitudinal tubercles in postero-median region, VIII with four macrosetae on each side of midline, posterior margin (Figure 11(d)) with two blunt inner processes and two outer processes slightly pointed at apex; male sternite VIII with seven macrosetae on each side of midline, posterior margin

subtriangularly convex, with long marginal in median region; posterior margin of female tergite VIII subtriangularly convex, posterior margin of female sternite VIII convex, slightly round, with conspicuous and long marginal setae, minute setae present in median region. *Aedeagus*. Median lobe (Figure 11(e,f)) narrowly ovate, apical process slightly constricted basally, narrow and convergent apically in ventral aspect; apical process slightly sinuate in lateral aspect. Apical lobe of paramerites (Figure 11(g)) with four setae; a-seta longest, the other setae short and subequal in length, c- and d-setae positioned apically. *Spermatheca*. S-shaped; bursa very large, with large and conical-shaped umbilicus; duct short and thick (Figure 11(h)).

### **Distribution**

Korea (South).

### **Type material**

Holotype, ♂, labelled as follows: 'KOREA: Gyeongbuk Prov., Cheongsong-gun, Cheongsong-eup, Wolo-ri, Mt. Juwangsan, Dalgi falls, N36°26'31.9" E129°7'48.7", 15 VI 2006, TK Kim, ex near stream under stones' (CNUIC). Paratypes, 7 exx. (total): 3 exx., same data as holotype (CNUIC); 2 exx. 'KOREA: Gangwon Prov.: Pyeongchang-gun, Jinbu-myeon, Dongsan-ri, Mt. Odaesan, Sangwonsa, N37°47.074' E128°33.735', 15 V 2006, T.-K. Kim, H.-W. Kim, ex near stream (CNUIC); 1 ex., same data as former except for 'sifting, leaf litter'; 1 ex., same data as former except for 'H.-W. Kim' (CNUIC).

### **Material examined**

SOUTH KOREA: Gangwon Prov.: 1 ex., Hongcheon-gun, Naechon-myeon, Mt Baekamsan, Garyeong-fall, 24 May 2002, KJ Ahn, JS Park, sifting; 1 ex., Pyeongchang-gun, Bangnim-myeon, Mt Baekdeoksan, 13 July 2001, SJ Park, near stream; 2 exx (one in 95% ethanol), Pyeongchang-gun, Jinbu-myeon, Mt Odaesan, Sangwonsa, 18 May 2002, SJ Park, CW Shin, sifting; 1 ex. (in 95% ethanol), same data as former except for 'N37°47'8.6"E128°33'56.2", 16 iv 2008, KJ Ahn, YH Kim, flood debris'.

### **Remarks**

This species is similar to *A. parviocularis* sp. nov., but can be distinguished by the characters provided in the key and different shape and structure of the aedeagus and spermatheca.

### **Etymology**

Named derived from the Latin *tuberculata* meaning 'tubercle', which is located on male abdominal tergite VII.

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