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A Review of the Spider Genus *Asiacoelotes* (Arachnida: Araneae: Amaurobiidae) in Korea

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Abstract: Two spider species of the genus *Asiacoelotes* collected from various areas of South Korea are reviewed with spination on each leg, detailed illustrations including trichobothrium patterns and SEM photographs of male palpal organs and female epigynum. These two species, *A. songminjae* (Paik & Yaginuma, 1969) and *A. insidiosus* (L. Koch, 1878), have been confused in Korea and Japan because they were previously incompletely described. *A. songminjae* is redescribed from the neotype and is here synonymized with *A. tropidosatus* (Wang & Zhu, 1991). *A. insidiosus* is recorded for the first time in Korea.

Key words: Taxonomy, Araneae, Amaurobiidae, *Asiacoelotes*, Korea

The spider subfamily Coelotinae is one of the most common holarctic spider taxa and comprises at least 373 species (Platnick, 2006; Wang, 2002, 2003, 2006). Wang (2002) made a generic revision of the Coelotinae and conducted a phylogenetic analysis based on 31 characters and 22 taxa, including two outgroup taxa (*Tamgrinia*, *Amaurobius*). In his study, he described the new genus *Asiacoelotes*, consisting of 16 species, characterized by the followings: male palpal organs including a large conductor lamella, an elongated cymbial furrow, a slender embolus, and absence of the conductor dorsal apophysis; and female genital structures with broad, closely situated spermathecae, small epigynal furrow, and a long rectangle-shaped slit on the center of the epigynum.

However, Korean specimens of *A. songminjae* from Yeongchi limestone cave, Jigsan-ri, Uljin-gun, Gyung-sangbuk-do, have been confused with *A. insidiosus* and *Coelotes*

exitialis in several reports because of the similar habitus, vague descriptions and illustrations, and unbelievable data (Kishida, 1936; Paik, 1942, 1962, 1967; Namkung, 1964; Paik & Kim, 1956). Paik (1971) regarded all *A. insidiosus* reported from Korea as misidentifications of *A. songminjae*, and did not think that *Coelotes exitialis* exist in the spider fauna of Korea. Paik (1978) followed the descriptions of *C. exitialis* from Japan by Koch (1877) and Yaginuma (1960) in his "Illustrated Flora and Fauna of Korea: Araneae". Although his proposal was widely accepted, some revised lists of Korean spider fauna (e.g., Platnick, 2006; Kim et al., 2005) still include doubtful species that lacked reliable source information.

Through a taxonomic study of Korean endemic cave spiders, we found that the previous records of *A. songminjae* contain two commonly confused species, *A. songminjae* and *A. insidiosus*. In an attempt to clarify this confusion, the type locality of *A. songminjae*, Yeongchi limestone cave, was surveyed ten times from August 2003 to September 2005 using pitfall traps but only adult male specimen was firstly collected without female. This species is thus redescribed from the neotype collected in an underground room (old office of the Arachnological Institute of Korea), Wangsimni, Seoul, as either the holotype is missing from the collection of the National Science Museum (NSM, Tokyo, Japan), or a descriptive error was made by the original authors (ICZN, articles 75.3). Although the original authors (Paik and Yaginuma, 1969) noted that they deposited the holotype of *A. songminjae* in the NSM, this could not be confirmed by museum staff (Dr. H. Ono, pers. comm.). *Asiacoelotes insidiosus* were collected by pitfall trapping and active searching in a small pine forest at Naksan beach in eastern Korea, approximately 150 km from Seoul. This species is also carefully with detailed illustrations and SEM photographs of the palpal organ and spinnerets.

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MATERIALS AND METHODS

Ten to 20 pitfall stations were established in several forests (Gwangreung, Mt. Paikwun, Mt. Yabong, Mt. Odae, Mt. Halla, Gyngsangnam-do districts (Haman, Cheolma), Naksan beach) and caves (Yongch-gul, Hwanseon-gul, Ogge-gul, Seongyu-gul, Cheongog-gul, Mosan-gul, Yongyeon-gul, Gossi-gul, Simbok-gul, Hoge-gul, Seong-gul) in Korea. At each station two pitfall traps (plastic cups, height 6.3 cm, diameter 8 cm) were set 10 m apart and filled with ethylene glycol (Greenslade & Greenslade, 1971). Drawings were prepared with an Olympus drawing tube under Olympus SZX 12 and BX51 interference contrast microscopes. Male palpi were expanded by quick immersion (5 min) in concentrated KOH (0.2 g/ml H₂O), followed by several rinses and prolonged soaking in distilled water. Full expansion in many cases was only obtained after several KOH-H₂O cycles. Specimens were fixed and preserved in 70% ethanol. Before dissection, the whole body was drawn and body length measurements made from whole specimens temporarily mounted in lactophenol. Specimens were dissected in lactophenol, and the dissected parts were individually mounted in lactophenol under cover slips subsequently sealed with Glyceel or transparent nail varnish. SEM photographs were also taken for more detailed analysis. Scale bars in figures are in millimeters. All specimens examined in this paper will be deposited in the National Biological Resources Center (NBRC).

Abbreviations: a, apical; AER, anterior eye row; AGS, aciniform gland spigots; AIK, Arachnological Institute of Korea; ALE, anterior lateral eye; ALS, anterior lateral spinneret; AME, anterior median eye; CGS, cylindrical gland spigots; d, dorsal view; ITA, intermediated tibial apophysis; mAGS, major ampullate gland spigots; p, prolateral view; PER, posterior eye row; PLE, posterior lateral eye; PLS, posterior lateral spinneret; PME, posterior median eye; PMS, posterior median spinneret; r, retrolateral view; RTA, retrolateral tibial apophysis; v, ventral view.

SPECIES ACCOUNT

Asiacoelotes songminjae (Paik & Yaginuma, 1969)
(Figs. 1-4, 9a)

Coelotes songminjae Paik & Yaginuma, in Paik, Yaginuma & Namkung, 1969, p. 839, figs. 65-69 (D ♀). - Paik, 1971, p. 172, figs. 1-6 (D ♂), 1978, p. 351, fig. 158.1-8 (♂ ♀). - Paik & Namkung, 1979, p. 56, fig. 41a-b (♂ ♀). - Namkung, 2002, p. 388, fig. 28.2a-b (♂ ♀), 2003, p. 390, fig. 28.2a-b (♂ ♀).

Coelotes tropidosatus Wang & Zhu, 1991, p. 4, figs. 9-10 (D ♀). - Song, Zhu & Chen, 1999, p. 388, fig. 226A-B (♀).

Asiacoelotes songminjae: Wang, 2002: 32.

Asiacoelotes tropidosatus: Wang, 2002, 33.

Diagnosis: *Asiacoelotes songminjae* has four retrolateral teeth on right chelicerae (three on left chelicerae), 3rd metatarsus with one spine (0-1-0) on ventral in female and horizontally bent slender conductor in male palpal organ. This species belongs to the *A. songminjae* complex in having the combination of slender embolus, three or four retromarginal teeth, broadly convoluted spermatheca closely situated and the absence of the conductor dorsal apophysis. *A. songminjae* is, however, clearly distinguishable from other closely related species by the epigynal furrow with slightly curved hiatus (semicircular in *A. insidiosus*); six distinct rotations of spermatheca (unreliable in *A. insidiosus*); four retrolateral teeth of right chelicerae in female (three in *A. insidiosus*); palpal organ with a blunt embolus apex (Fig. 4E), horizontally bent conductor (Fig. 3F-G), and median apophysis spoon-like with distal end rounded (Figs. 3G, 4D); cymbial furrow three-quarters the length of the tarsus (Fig. 3G-H); and intermediate tibial apophysis (ITA) a small ear-shaped slit (Figs. 3G, 4C). Furthermore, this species has the following leg spination (Table 1): Female - 1st tibia with six (2-2-2a) spines on ventral (five, 2-2-1a in *A. insidiosus*), metatarsus six (2-2-2) on ventral; 2nd tibia with six (2-2-2a) on ventral (four, 1-2-1a in *A. insidiosus*); 3rd tibia with two (1-1 on prolateral), metatarsus one (0-1-0) on ventral (absent in *A. insidiosus*); 4th metatarsus with 16 spines, tarsus one (0-1-0) on prolateral (absent in *A. insidiosus*). Male - first tibia with five (2-2-1a) spines on ventral (six, 2-2-2a in *A. insidiosus*); 2nd and 3rd femur with six spines (seven in *A. insidiosus*), and 3rd metatarsus 15 spines (16 in *A. insidiosus*).

Also, *Asiacoelotes songminjae* described on only specimen of the female in Yeongchi cave cannot be reliably identified from the basis of non-unique characters and poor descriptions; indistinct epigynum (semicircular, with a simple opening in the centre in Paik et al., 1969, p. 841), confused spermathecal duct (complicated and variable), and no fertilization duct and spermathecal head in their illustrations (Paik et al., 1969, p. 840, figs. 65-67). We firstly collected the male of *A. songminjae* in the type locality and surveyed many specimens of *Asiacoelotes* species in several forests and caves. From a reexamination of Korean *A. songminjae*, we conclude that this group consists of two species, *A. insidiosus* and *A. songminjae*. Additionally, the neotype of *A. songminjae* is necessary to be redescribed from the proper specimens of both sexes collected in the same locality because of the insufficient descriptions, unbelievable data and the loss of the holotype collection or the mistake of the authors in the original description.

Female/Male (mm): Total body length 10.7/6.2; carapace length 4.7/3.2, carapace width 3.2/2.2, carapace height 2.7/1.9; cheliceral length 1.9/1.1, cheliceral width 0.9/0.6,

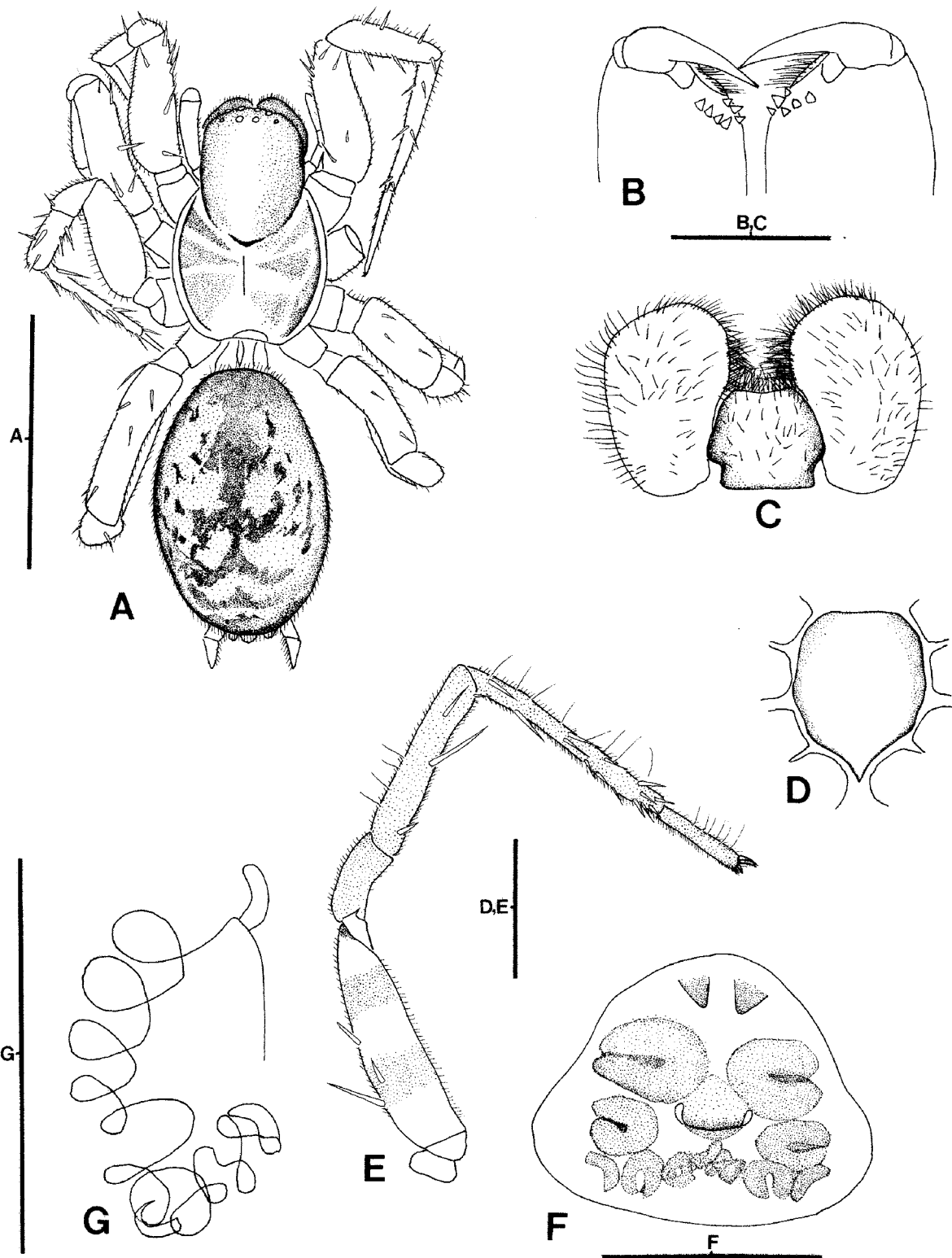


Fig. 1. *Asiacoelotes songminjae* (Paik & Yaginuma, 1969) in Korea, female. A, Habitus, dorsal view. B, Chelicerae, posterior view. C, Endite and labium, ventral view. D, Sternum, ventral view. E, 4th leg (left), prolateral view. F, Epigynum, ventral view. G, Diagram of convoluted spermatheca (right), ventral view. Scale bars = 5 mm (A), 2 mm (D, E), and 1 mm (B-C, G, F).

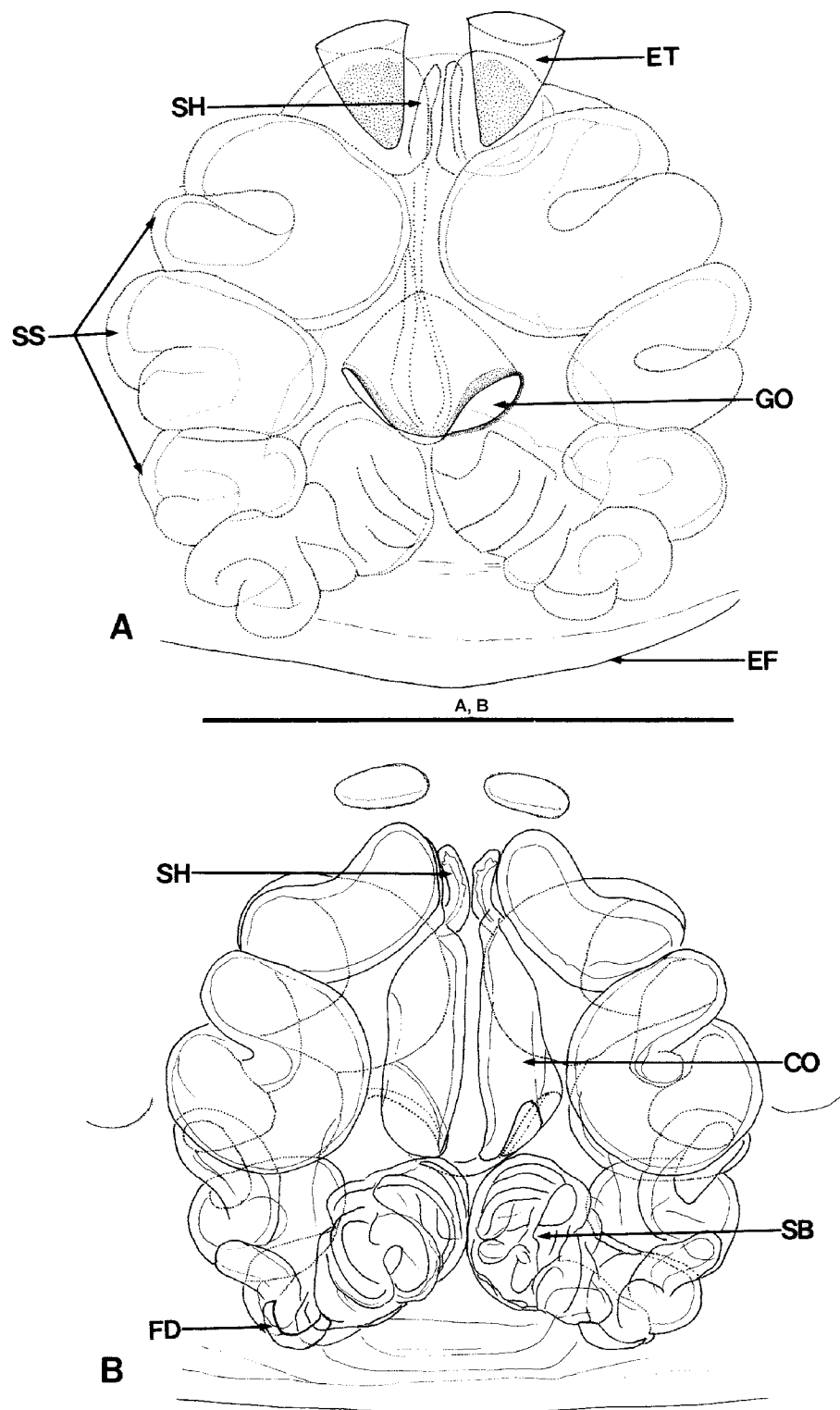


Fig. 2. *Asiacoelotes songminjae* (Paik & Yaginuma, 1969) in Korea, female. A, Epigynum, ventral view. B, Genitalia, dorsal view. Note: CD, copulatory duct; ET, epigynal teeth; FD, fertilization duct; GO, genital opening; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk; EF, epigastric furrow. Scale bar = 0.5 mm (A, B).

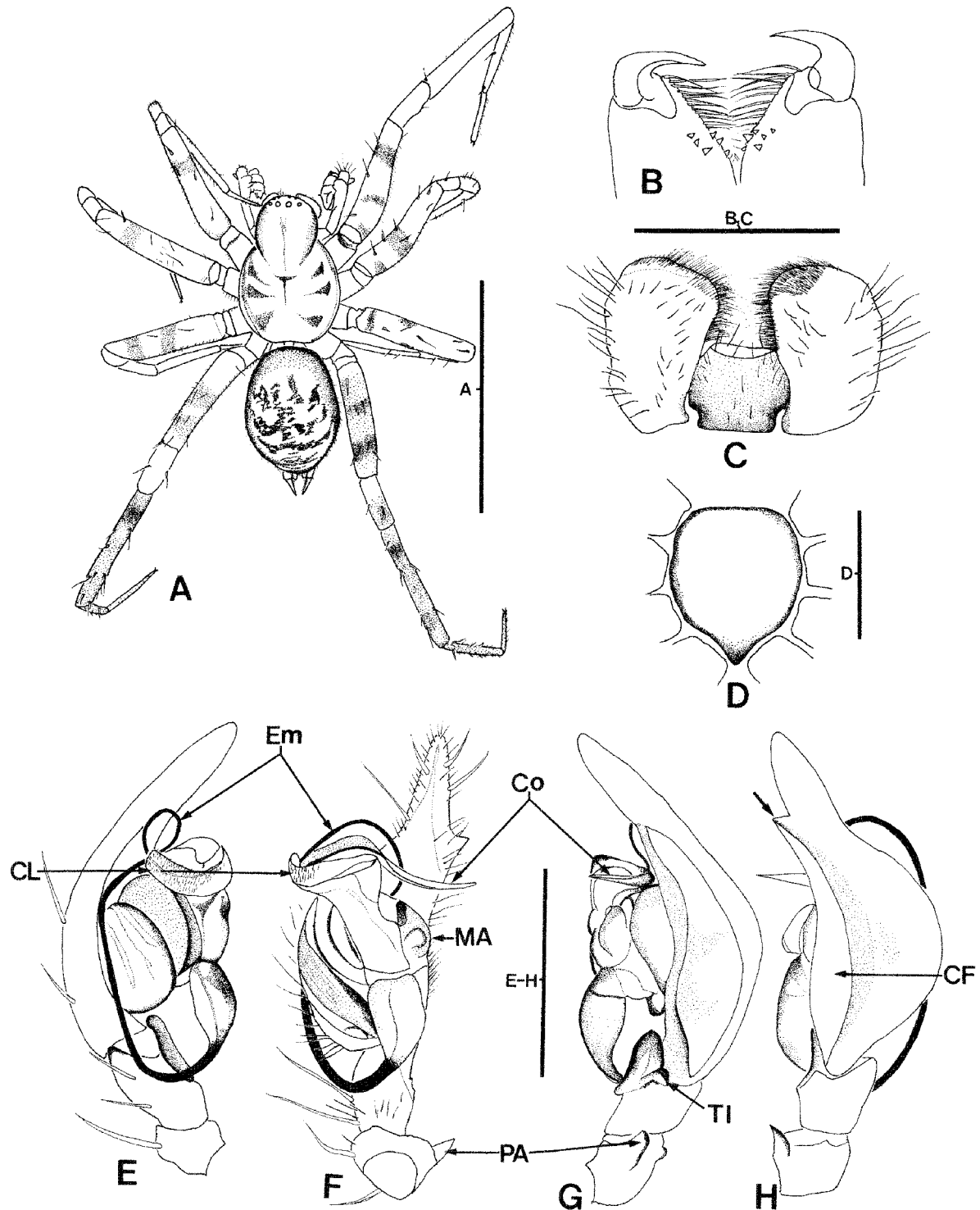


Fig. 3. *Asiacoelotes songminjae* (Paik & Yaginuma, 1969) in Korea, male. A, Habitus, dorsal view. B, Chelicerae, posterior view. C, Endite and labium, ventral view. D, Sternum, ventral view. E-H, Pedipalp, left part, H, projecting point on upper (arrow). Note: Co, conductor; CL, conductor lamella; CF, cymbial furrow; Em, embolus; MA, median apophysis; PA, patellar apophysis; TI, tibial intermediated apophysis. Scale bars = 5 mm (A), 2 mm (D), and 1 mm (B-C, E-H).

cheliceral fang length 1.0/0.6; sternum length 2.5/1.7, sternum width 2.0/1.4; endite length 1.4/0.9, endite width 1.0/0.5; labium length 0.7/0.4, labium width 0.8/0.5;

clypeus height 0.3/0.2; AER 1.0/0.6, PER 1.2/0.7, AME 0.2/0.2, ALE 0.2/0.2, PME 0.2/0.2, PLE 0.2/0.2. Eye formula ALE = PLE = PME = AME/ALE = PLE = PME

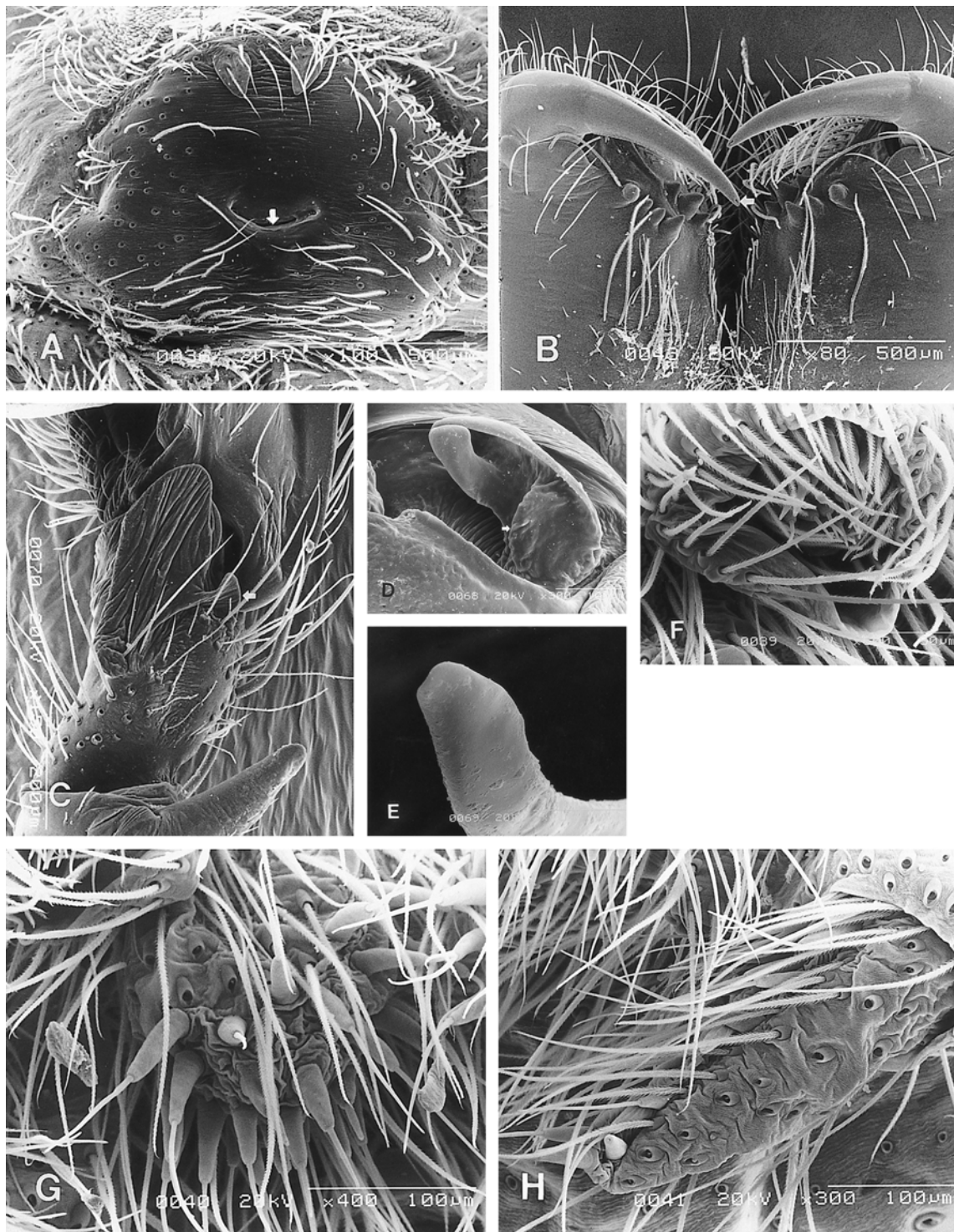


Fig. 4. SEM photograph of *Asiacaelotes songminjae* (Paik & Yaginuma, 1969) in Korea. A, Epigynum, dorsal view, posterior extension of anterior marginal center (arrow). B, Chelicerae, posterior view, apex of cheliceral fang (arrow). C, Tibial apophysis, retrolateral view, intermediate apophysis (arrow). D, Median apophysis, ventral view, an interior semicircular projection (arrow). E, Embolus apex, mesal view. F, Female ALS, ventral view, major ampullate gland spigot (arrow). G, Female PMS, ventral view, cylindrical gland spigot (arrow). H, Female PLS, ventral view. Scale bars = 500 μm (A, B), 200 μm (C), 100 μm (D, G, H), 50 μm (F), and 10 μm (E).

= AME. 1st leg 12.8/11.3 (3.5/3.2, 1.6/1.5, 3.0/2.5, 3.1/2.6, 1.6/1.5), 2nd leg 11.6/10.4 (3.4/2.9, 1.5/1.5, 2.4/2.1, 2.8/2.4, 1.5/1.5), 3rd leg 10.9/9.8 (3.1/2.7, 1.3/1.4, 2.2/1.8, 3.0/2.6,

1.3/1.3), 4th leg 14.5/13.6 (4.0/3.6, 1.6/1.6, 3.2/2.9, 4.1/3.7, 1.6/1.8). Leg formula 4123/4123. Abdomen length 5.0/3.0, width 3.4/2.0, height 3.4/1.7; ALS 0.6/0.3; PLS 1.2/1.1

Table 1. Spination of leg segments of *Asiacoelotes songminjae* (Paik & Yaginuma, 1969) from Korea

Character	Dorsal (♂/♀)	Prolateral (♂/♀)	Retrolateral (♂/♀)	Ventral (♂/♀)
1st Leg Femur	123/111	0 1/002a	0/1 1	0/0
Tibia	0/0	0/0	0/0	222a/221a
Metat.	0/0	001/001	0/001a	222/221
Tarsus	0/0	0/0	0/0	0/0
2nd Leg Femur	122/112	011/1 1	0/0	0/0
Tibia	0/0	1 1/1 1	0/0	222a/222a
Metat.	0/0	102/1 2a	001/0	221/222
Tarsus	0/0	0/0	0/0	0/0
3rd Leg Femur	122/123	1 1/0	0/0	0/0
Tibia	110/1 1	1 1/1 1	1 1/1 1	222a/222a
Metat.	0/0	122/122	112/112	222/222a
Tarsus	0/0	0/0	010/0	010/0
4th Leg Femur	123/213	0/0	0/0	0/0
Tibia	1 1/1 1	1 1/1 1	011/1 1	222a/222a
Metat.	0/011	122/122	122/122	222/222a
Tarsus	0/0	010/0	010/010	0/0

a, apical part; Metat., metatarsus.

(0.6/0.6, 0.6/0.5).

Female (neotype): Medium sized spider (10.7 mm), found wandering on the ground. Carapace elongate, moderately narrowed in eye area, and distinctly longitudinal fovea on middle. Abdomen dark brown with gray chevron patterns, heavily covered with short hairs (Fig. 1A). Palp, total length 4.4, with 13 trichobothria on tibia and one claw possessing five pectinated teeth. From dorsal, anterior eye row (AER) more or less procurved, posterior eye row (PER) straight and AER slightly smaller than PER. All eyes roughly equal in size. Clypeal height less than twice AME diameter and chilum absent. Chelicerae with three promarginal teeth, four retromarginal (three in left part), condyle developed on lateral boss at base, and fang slightly longer than cheliceral width (Figs. 1B, 4B). Endite longer than width and labium slightly wider than long (Fig. 1C). Sternum shield-shaped, longer than width, widest in 2nd coxae, posterior end protruded between hind coxae (Fig. 1D). Legs with ring patterns (Figs. 1A, 1E, 9): 4th leg longest, 3rd shortest; length of 1st leg (patella + tibia) slightly shorter than carapace length; trochanters not notched; tibia 10-17 trichobothria in four rows (3p-2d-1d-4r in 1st leg, 4p-5d-4d-3r in 2nd, 3p-4-d-2d-3r in 3rd, 4p-6d-4d-4r in 4th); metatarsus three to seven in one row (seven in 1st leg, three in 2nd, six in 3rd and 4th); tarsus five to seven in one row (seven in 1st leg and 3rd, five in 2nd, six in 4th); tarsal organ situated close to distal end of tarsus, slightly anterior of most distal trichobothrium; tarsi with three claws, upper claw with ten pectinated teeth, lower with three. Leg spination (Table 1): 1st leg femur with seven spines, tibia with six (2-2-2a) on ventral, metatarsus seven (one, 0-0-1 on prolateral; six, 2-2-2 on ventral); 2nd leg femur with seven spines, tibia eight (two, 1-1 on prolateral; six, 2-2-2a on ventral), metatarsus nine (three, 1-0-2 on prolateral; one, 0-0-1 on retrolateral; five,

2-2-1 on ventral); 3rd leg femur with seven spines; tibia 12 (two, 1-1-0 on dorsal; two, 1-1 on prolateral; two, 1-1 on retrolateral; six, 2-2-2a on ventral), metatarsus 15 (five, 1-2-2 on prolateral; four, 1-1-2 on retrolateral; six, 2-2-2 on ventral), tarsus two (two, 0-1-0 on retrolateral and ventral); 4th leg femur with six spines, tibia 12 (two, 1-1 on dorsal; two, 1-1 on prolateral; two, 0-1-1 on retrolateral; six, 2-2-2a on ventral), metatarsus 16 (ten, 1-2-2 on prolateral and retrolateral; six, 2-2-2 on ventral), tarsus two (two, 0-1-0 on prolateral and retrolateral).

Female epigynum with short epigynal teeth slightly longer than width, anteriorly situated, separated by as far as their width (Figs. 1F, 2A-B, 4A); genital opening reduced to epigynal furrow or slit, posteriorly extended from anterior marginal center, their width as long as the outside base of each epigynal tooth (Figs. 2A-B, 4A); copulatory ducts short, oriented straight towards epigynal teeth; spermathecal heads small, slender, situated between epigynal teeth (Fig. 2A-B); spermathecae with stalks strongly elongated, always with six convolutions on base (Figs. 1G, 2); spermathecal bases are complicated structures, as long as copulatory duct, oblique-shaped oriented towards center of genital opening (Fig. 2A-B); fertilization duct short, slender, underside situated close to epigastric furrow (Fig. 2A-B). Trachea only a simple horizontal furrow, situated close to ALS. Spinnerets (Fig. 4F-H): colulus absent; ALS cylindrical, apex with two major ampullate gland spigots (MAP) at mesal margins, 28 piriform gland spigots; PMS with spigots situated on distal half of segment, one minor ampullate gland spigot (mAP), 25 aciniform gland spigots (AC), and two cylindrical gland spigots (CY); PLS with second segment about same length as first segment, with 37 aciniform gland spigots and two cylindrical gland spigots.

Male: Medium sized spider (6.2 mm), two-thirds as long

as female. Clypeal height about the same as AME diameter. Chelicerae with many long dense scopula; three promarginal teeth, median one longest; three retromarginal teeth, inner one longest, small condyle at base; fang as long as width (Fig. 3B). Legs with ring patterns (Figs. 3A, 9): formula 4123, similar to female; tarsi with three claws, upper claw with eight pectinated teeth, lower with three; tibia with 14-19 trichobothria in four rows (4p-5d-4d-6r in 1st leg, 3p-4d-3d-4d in 2nd, 5p-4d-4d-5r in 3rd, 4p-4d-3d-4r in 4th), metatarsus five to eight in one row (eight in 1st leg, seven in 2nd and 4th, five in 3rd), tarsus six to eight in one row (six in 1st and 3rd leg, eight in 2nd and 4th).

Leg spination (Table 1): 1st leg femur with seven spines, tibia with five (2-2-1a) on ventral, metatarsus seven (one, 0-0-1, on prolateral; one, 0-0-1a on retrolateral; five, 2-2-1 on ventral); 2nd femur six spines, tibia eight (two, 1-1 on prolateral; six, 2-2-2a on ventral); 3rd leg femur six spines, tibia 12 (six, 1-1 on dorsal view, prolateral and retrolateral; six, 2-2-2a on ventral), metatarsus 15 (five, 1-2-2 on prolateral; four, 1-1-2 on retrolateral; six, 2-2-2a on ventral); 4th leg femur six spines, tibia 12 (six, on dorsal view, prolateral and retrolateral, six, 2-2-2a on ventral), metatarsus 16 (two, 0-1-1 on dorsal; ten, 1-2-2 on prolateral and retrolateral; six, 2-2-2a on ventral), tarsus one (0-1-0) spine on retrolateral.

Male pedipalp with one patellar apophysis (Figs. 3F-H, 4C); retrolateral tibial apophysis (RTA) long, about same length as tibia, broadly extended beyond, with four long setae (Figs. 3F-H, 4C); intermediate tibial apophysis (ITA) a small grooved and ear-shaped (Figs. 3G-H, 4C); cymbial furrow very elongated, about three-quarters the length of the cymbium, well developed concave with projecting point on upper (Fig. 3G-H); conductor long, slender, horizontally bent and with modified sharp tip (Fig. 3F-G); conductor dorsal apophysis absent; conductor lamella large, modified with many small setules (Fig. 3E-F); embolus posterior in origin, extremely long linear, and with blunt apex (Figs. E-F, 4E); median apophysis spoon-like, with distal end rounded and interior semicircular projection in middle (Figs. 3F-G, 4E).

Type specimens: Neotype ♀, an underground room of old AIK, Wangsimni, Seoul, Korea, 12-June-2001; 1 ♂, same locality, 16-September-2000, B.W. Kim.

Specimens examined in Korea: Paraneotypes 1 ♂, an underground room of old AIK, Wangsimni, Seoul, Korea, 16-September-2000, B.W. Kim, 1 ♀, 12-June-2001; 2 ♀ ♀, Mt. Ungil, Namyangju-si, 31-April-1984, K.S. Lee, 1 ♀, 29-May-2000, 2 ♀ ♀, Mt. Yebong, 24-March-2001, 1 ♀, 18-April-2005, 1 ♀, 14-May-2005; 1 ♂, Mt. Nam, Seoul, 20-September-2000; 1 ♂, 1 ♀, about Dong river, Yeongwol-gun, 7-October-2002; 1 ♂, Yeongchi limestone cave, Uljin-gun, 11-October-2003; 1 ♀, temple Woljeong, Mt. Odae, Korea, 22-July-2005, 2 ♂ ♂, 4-September-2005;

1 ♂ with 2 subadult females, Okgye limestone cave, Gangwon-do, 3-September-2005; 1 ♂, Segeomjeong, Seoul, 26-October-2005, 1 ♀, 7-November-2005.

Distribution: Korea (Seoul, Mt. Yebong, Mt. Ungil, Mt. Odae, Okgye cave, Yeongchi cave), China (Jilin).

Asiacoelotes insidiosus (L. Koch, 1878)
(Figs. 5-8, 9b)

Coelotes insidiosus L. Koch, 1878, p. 751, pl. 15, figs. 12-13 (D ♂).

Coras insidiosus: Simon, 1898, p. 258. - Boesenberg & Strand, 1906, p. 300, pl. 16, fig. 458 (♂ ♀). - Saito, 1939, p. 62, fig. 8(1) (♂), 1959, p. 38, fig. 15a-c (♂). - Yaginuma, 1960, p. 93, fig. 82.6 (♀). - Shinkai, 1969, p. 34, fig. 18 (♂). - Yaginuma, 1971, p. 93, fig. 82.6 (♀).

Tegenaria curta Boesenberg & Strand, 1906, p. 303, pl. 16, fig. 478 (D ♀).

Coelotes curtus: Lehtinen, 1967, p. 224 (♀). - Nishikawa, 1974, p. 178, fig. 32 (♀).

Coelotes insidiosus: Lehtinen, 1967, p. 224, fig. 235. - Nishikawa, 1974, p. 177, figs. 20-22 (♂ ♀). - Nishikawa, 1977, p. 34, figs. 6-7 (♂). - Shinkai, 1978, p. 95, fig. 37 (♂). - Simojana, 1982, p. 80, figs. 6-8, 12-13 (♂ ♀). - Irie, 1984, p. 16, figs. 1-6 (♂ ♀). - Yaginuma, 1986, p. 148, fig. 80.4 (♂ ♀). - Chikuni, 1989, p. 100, fig. 9 (♂ ♀). - Marusik & Logunov, 1991, p. 93, fig. 1.3 (♀).

Asiacoelotes insidiosus: Wang, 2002, p. 32.

Diagnosis: *Asiacoelotes insidiosus* has special structures with epigynal furrow almost semicircular in female and cymbial furrow three-fifths as long as tarsus and broadly bent conductor in male palpal organ. This species is similar to *A. songminjae* in having a slender embolus, three or four retromarginal teeth, broadly convoluted spermatheca closely situated and the absence of the conductor dorsal apophysis. However, it is clearly distinguishable by the epigynal teeth which are separated by as much as their length; epigynal furrow almost semicircular (slightly curved in *A. songminjae*); indistinct rotations of spermatheca (six in *A. songminjae*); three retrolateral teeth of right chelicerae in female (four in *A. songminjae*); palpal organ with a knife-shaped embolus apex (Fig. 8D); bent conductor (Fig. 7F-G); median apophysis spoon-like with sharp distal end (Figs. 7F, 8B); cymbial furrow three-fifths as long as tarsus (Fig. 7G-H); intermediate tibial apophysis (ITA) a small apophysis (Fig. 7G-H, 8C). Furthermore, this species has the following leg spination (Table 2): Female - 1st tibia with five (2-2-1a) spines on ventral (six, 2-2-2a in *A. songminjae*), metatarsus six (2-2-2) on ventral (five, 1-2-2 in *A. songminjae*); 2nd tibia with four (1-2-1a) spines on ventral (six, 2-2-2a in *A. songminjae*); 3rd tibia with two (1-1) spines on prolateral; 4th metatarsus with 16 spines, tarsus absent on prolateral (one, 0-1-0 in *A. songminjae*). Male - tibia with six (2-2-2a)

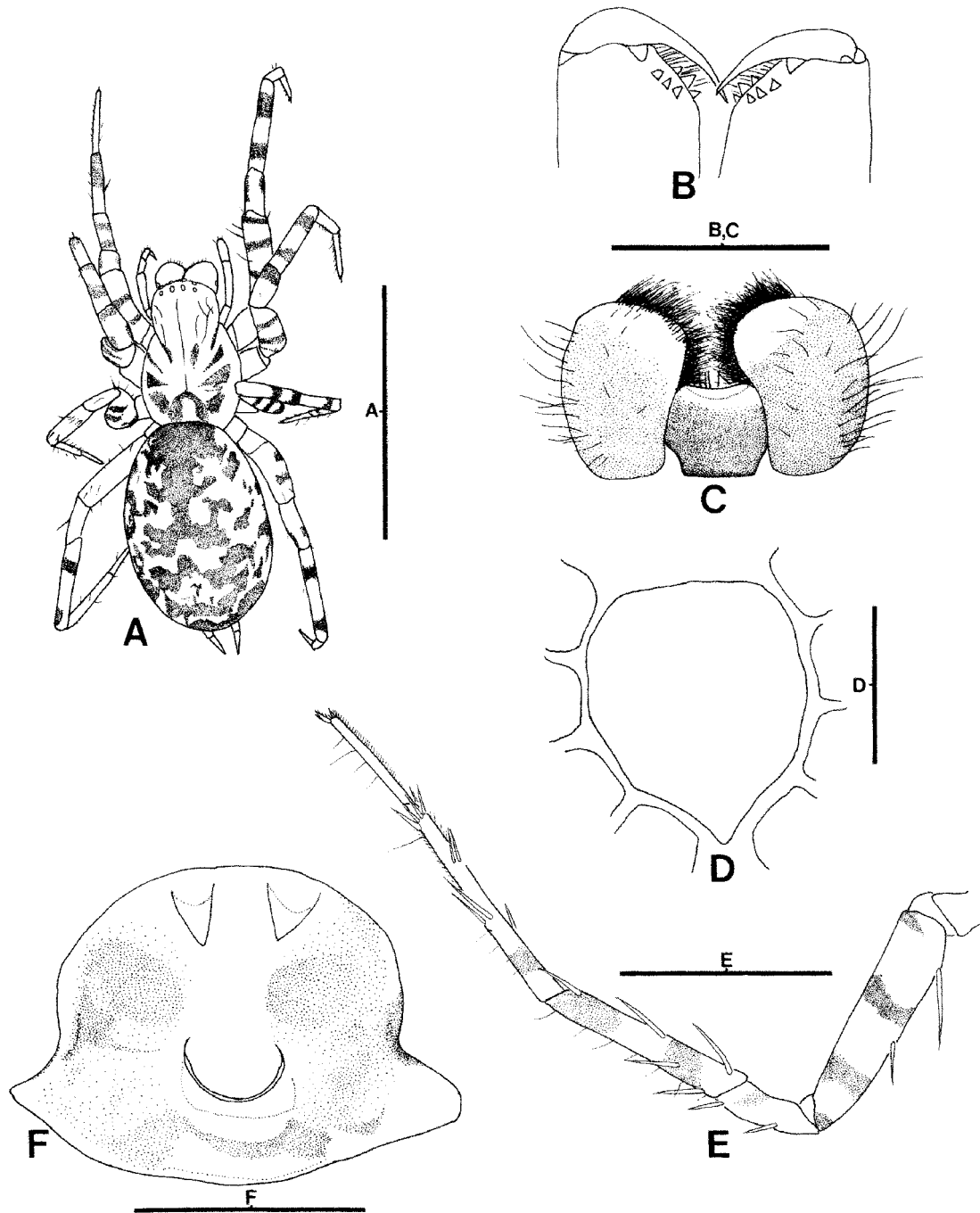


Fig. 5. *Asiacoelotes insidiosus* (L. Koch, 1878) in Korea, female. A, Habitus, dorsal view. B, Chelicerae, ventral view. C, Endite and labium, ventral view. D, Sternum, ventral view. E, leg IV (left), prolateral view. F, epigynum, ventral view. G, Diagram of convoluted spermatheca (right), ventral view. Scale bars = 5 mm (A), 2 mm (E), 1 mm (B-D), and 0.5 mm (F).

spines on ventral (five, 2-2-1a in *A. songminjae*); 2nd and 3rd femur with seven spines (six in *A. songminjae*), and 3rd metatarsus 16 spines (15 in *A. songminjae*).

Female/Male (mm): Total body length 6.8/8.9; carapace length 3.4/4.1, carapace width 2.1/2.8, carapace height 1.8/2.2; cheliceral length 1.3/1.3, cheliceral width 0.6/0.9, cheliceral fang length 0.6/0.7; sternum length 1.6/2.3,

sternum width 1.3/1.6; endite length 0.9/1.0, endite width 0.5/0.6; labium length 0.4/0.5, labium width 0.5/0.6; clypeus height 0.2/0.4; AER 0.6/0.8, PER 0.7/0.9, AME 0.1/0.2, ALE 0.1/0.2, PME 0.1/0.2, PLE 0.1/0.2. Eye formula ALE = PLE = PME = AME/ALE = PLE = PME = AME. 1st leg 8.0/12.3 (2.2/3.3, 1.0/1.6, 1.8/2.8, 1.9/2.9, 1.1/1.7), 2nd leg 7.3/10.7 (2.1/2.8, 1.0/1.4, 1.5/2.3, 1.7/2.6,

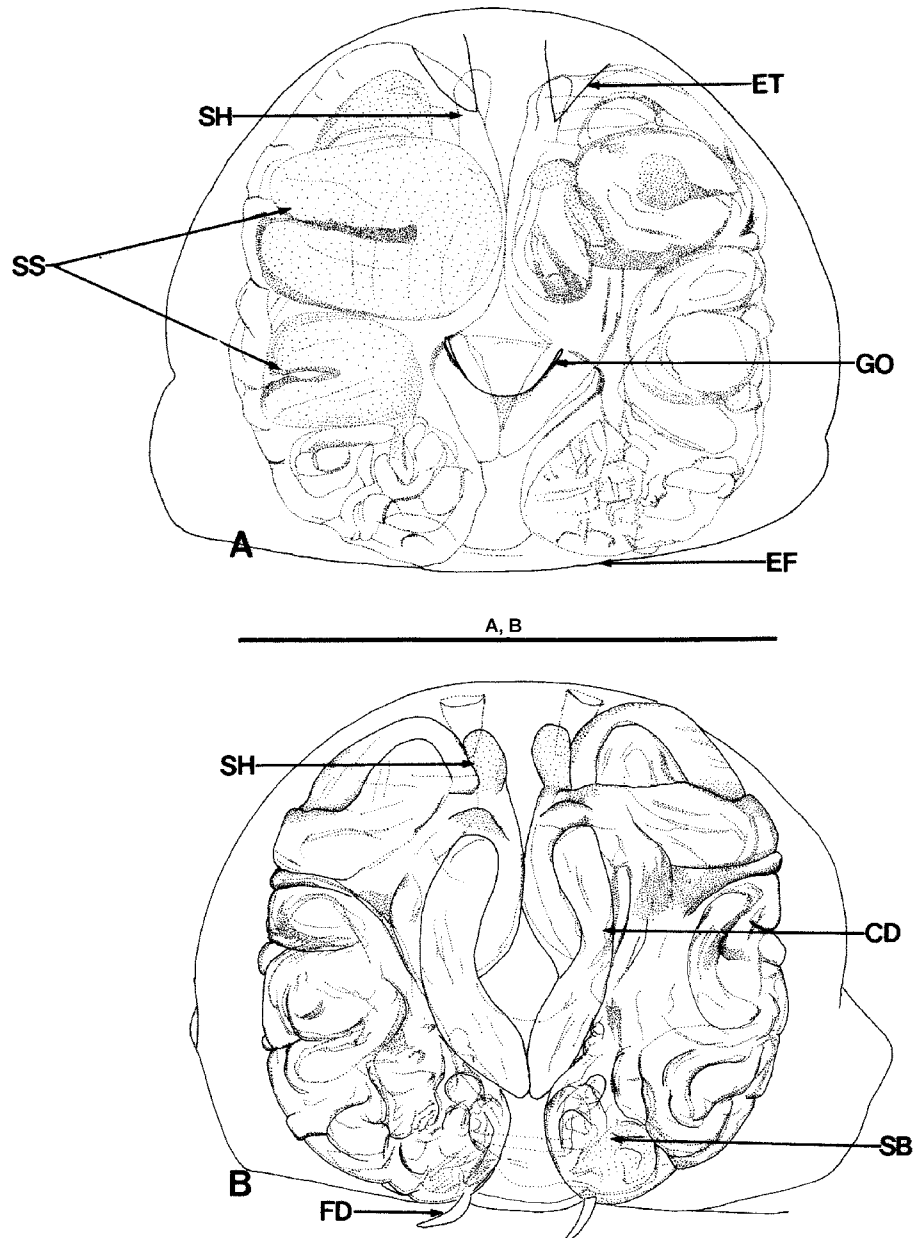


Fig. 6. *Asiacoelotes insidiosus* (L. Koch, 1878) in Korea, female. A, Epigynum, ventral view. B, Genitalia, dorsal view. Note: CD, copulatory duct; ET, epigynal teeth; FD, fertilization duct; GO, genital opening; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk; EF, epigastric furrow. Scale bar = 0.5 mm (A, B).

1.0/1.6), 3rd leg 7.2/10.1 (2.0/2.7, 1.0/1.3, 1.4/2.0, 1.8/2.7, 1.0/1.4), 4th leg 9.2/13.4 (2.4/3.6, 1.0/1.4, 2.1/2.8, 2.6/3.8, 1.1/1.8). Leg formula 4123/4123. Abdomen length 2.0/3.8, width 1.3/2.6, height 1.4/2.6; ALS 0.4/0.4; PLS 0.9/0.9 (0.4/0.4, 0.5/0.5).

Female: Medium sized spider (6.8 mm) shorter than male, found under stones and in dead trees on the ground of forests. Carapace red brown, moderately narrowed in eye area, and distinctly longitudinal fovea on middle (Fig. 5A). Abdomen dark brown with gray spotted patterns, heavily covered with short hairs. Palp total length 3.0, with ten

trichobothria on tibia and one claw possessing eight pectinated teeth. From dorsal, anterior eye row (AER) slightly procurved, posterior eye row (PER) straight and AER slightly smaller than PER. All eyes of roughly equal size. Clypeal height less than twice the AME diameter and chilum absent. Chelicerae with three promarginal teeth, three retromarginal teeth, condyle developed on lateral boss at base, and fang as long as cheliceral width (Fig. 5B). Endite almost half as long again as width and labium slightly wider than long (Fig. 5C). Sternum shield-shaped, longer than width, widest in 2nd coxae, posterior end

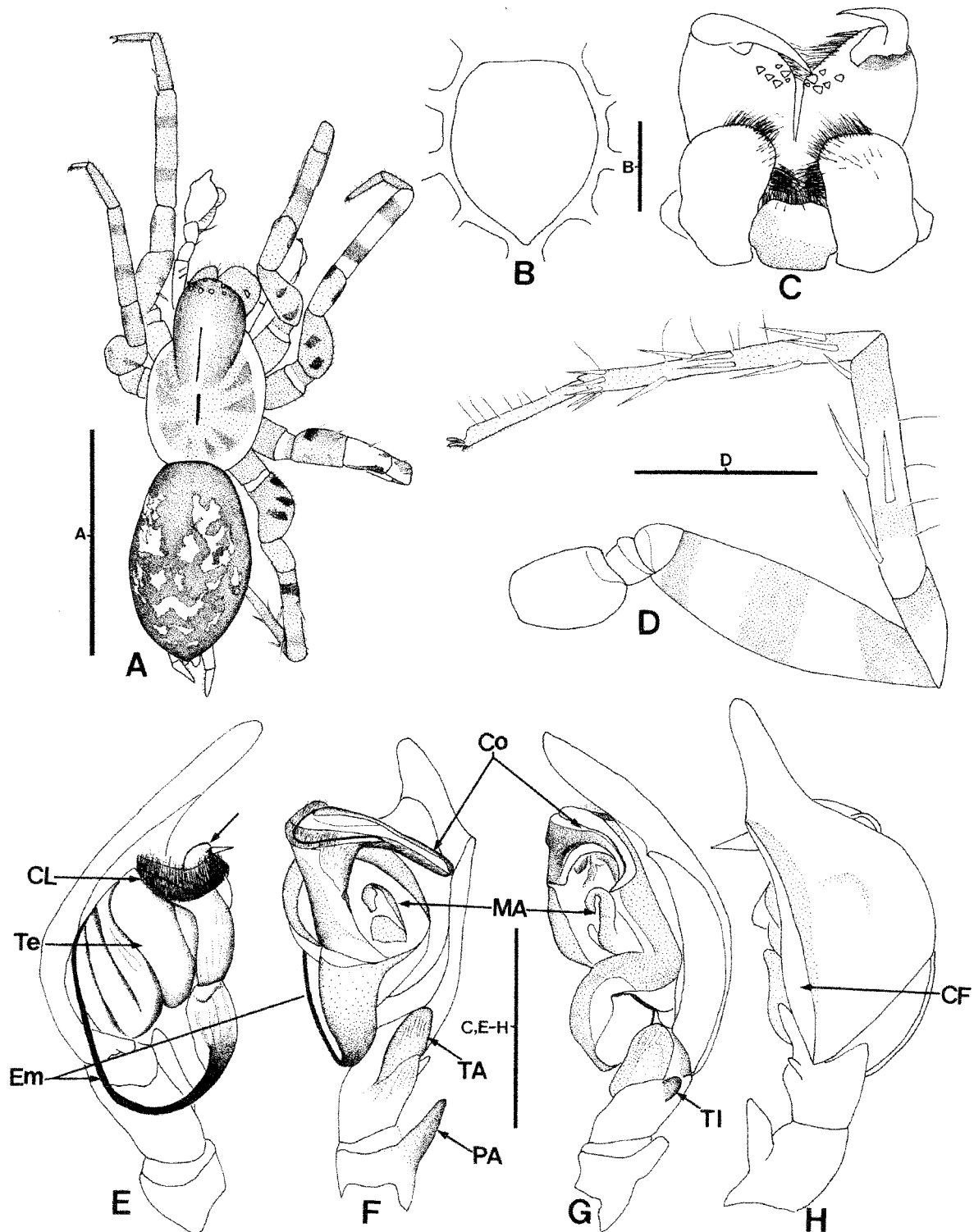


Fig. 7. *Asiacoelotes insidiosus* (L. Koch, 1878) in Korea, male. A, Habitus, dorsal view. B, Chelicerae, ventral view. C, Endite and labium, ventral view. D, Sternum, ventral view. E-H, Pedipalp, left part. Note: Co, conductor; CL, conductor lamella; CF, cymbial furrow; Em, embolus; MA, median apophysis; PA, patellar apophysis; Te, tegulum; TA, tibial apophysis; TI, tibial intermediate apophysis. Scale bars = 5 mm (A), 2 mm (D), and 1 mm (B, C, E-H).

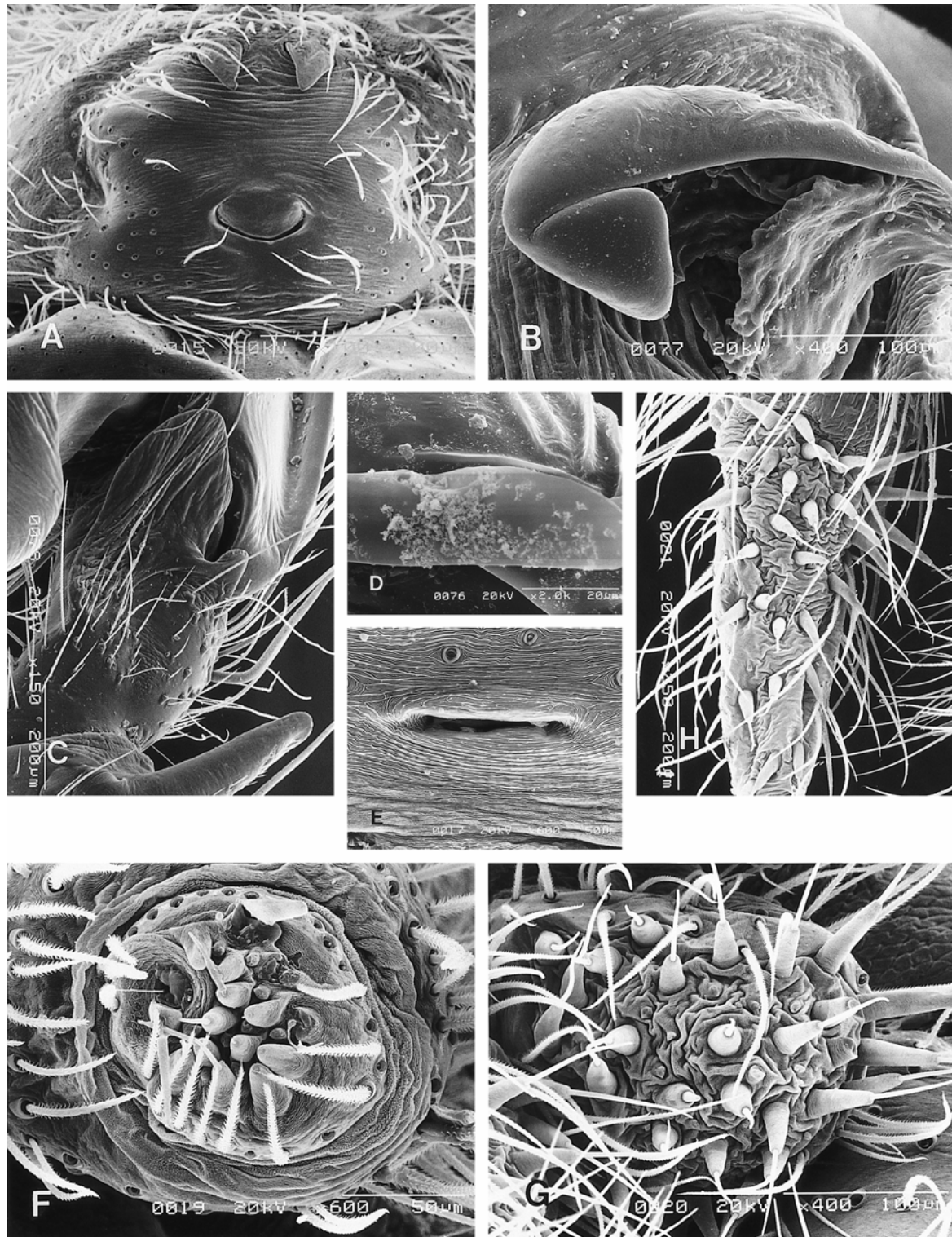


Fig. 8. SEM photograph of *Asiacoelotes insidiosus* (L. Koch, 1878) in Korea. A, Epigynum, dorsal view. B, Trachea, ventral view. C, Median apophysis, ventral view. D, Embolus apex, mesal view. E, Female ALS, ventral view. F, Female PMS, ventral view. G, Female PLS, ventral view. Note: Cod, conductor; CoL, conductor lamella; Cyf, cymbial furrow; EmB, embolus base; MeA, median apophysis; PaA, patellar apophysis; Teu, tegulum; TiA, tibial apophysis; TIA, tibial intermediate apophysis. Scale bars = 500 µm (A), 200 µm (C, H), 100 µm (B, G), 50 µm (E, F), and 20 µm (D).

Table 2. Spination of leg segments of *Asiacoelotes insidiosus* (L. Koch, 1878) from Korea

Characters	Dorsal (♂/♀)	Prolateral (♂/♀)	Retrolateral (♂/♀)	Ventral (♂/♀)
1st Leg Femur	122/122	002/0	0/0	0/0 2
Tibia	0/0	0/0	0/0	221a/222a
Metat.	0/0	001/0	0/0	222/222a
Tarsus	0/0	0/0	0/0	0/0
2nd Leg Femur	212/122	1 1/1 1	0/0	0/0
Tibia	0/0	011/0	0/1 1	121a/222a
Metat.	0/0	102/0	0/102	222/222
Tarsus	0/0	0/0	0/0	0/0
3rd Leg Femur	122/122	1 1/0	0/0	0/1 1
Tibia	101/1 1	1 1/1 1	1 1/1 1	222a/222a
Metat.	010/022	112/111	112/111	222/222
Tarsus	0/0	0/0	010/0	010/0
4th Leg Femur	112/112	1 1/0	0/1 1	0/0
Tibia	101/1 1	1 1/1 1	1 1/1 1	222a/222a
Metat.	0/022	122/111	122/111	222/222
Tarsus	0/0	0/0	1 0/0	011/0

a, apical part; Metat., metatarsus.

protruded between hind coxae (Fig. 5D). Legs with ring patterns (Fig. 5A, E, 9): 4th leg longest, 3rd shortest; length of 1st leg (patella + tibia) always shorter than carapace length; trochanters not notched; tibia with 11-16 trichobothria in four rows (4p-5d-2d-4r in 1st leg, 4p-4d-3d-3r in 2nd, 1p-5d-4d-1r in 3rd, 3p-4d-5d-4r in 4th), metatarsus three to six in one row (six in 1st leg, three in 2nd, five in 3rd, six in 4th), tarsus five to six in one row (six in 1st, 3rd and 4th leg, five in 2nd); tarsal organ situated close to distal end of tarsus, slightly anterior of most distal trichobothria; tarsi with three claws, upper claw with nine pectinated teeth, lower with three. Leg spination (Table 2): 1st leg femur with seven spines, tibia with five (2-2-1a) on ventral, metatarsus seven (one, 0-0-1 on prolateral; six, 2-2-2 on ventral); 2nd leg femur with seven spines, tibia six (two, 0-1-1 on prolateral; four, 1-2-1a on ventral), metatarsus nine (three, 1-0-2 on prolateral; six, 2-2-2 on ventral); 3rd leg femur with seven spines, tibia 12 (two, 1-0-1 on dorsal; two, 1-1 on prolateral and retrolateral; six, 2-2-2a on ventral), metatarsus 15 (one, 0-1-0 on dorsal; eight, 1-1-2 on prolateral and retrolateral; six, 2-2-2 on ventral), tarsus two (0-1-0 on retrolateral and ventral); 4th leg femur with six spines, tibia 12 (two, 1-0-1 on dorsal; four, 1-1 on prolateral and retrolateral; six, 2-2-2a on ventral), metatarsus 16 (ten, 1-2-2 on prolateral and retrolateral; six, 2-2-2 on ventral), tarsus three (one, 1-0 on retrolateral; two, 0-1-1 on ventral).

Female epigynum with short epigynal teeth almost as long as width, anteriorly situated, separated by as far as their width (Figs. 5F); genital opening reduced to epigynal furrow, curved almost to semicircular hiatus, their width equal to the outside base of each epigynal tooth (Figs. 5F, 6A, 8A); copulatory ducts short, slightly bent toward epigynal teeth (Fig. 6A-B); spermathecal heads small, slender, situated between epigynal teeth (Fig. 6A-B);

spermathecae with stalks strongly elongated, indistinctly convoluted (Fig. 6); spermathecal bases are complicated structures, shorter than copulatory duct, not oblique-shaped (Fig. 6A-B); fertilization duct short, slender, underside situated close to epigastric furrow (Fig. 6A-B). Trachea only a simple horizontal furrow, situated close to ALS (Fig. 8E). Spinnerets (Fig. 8F-H): colulus absent; ALS cylindrical, apex with two major ampullate gland spigots (MAP) at mesal margins, 28 piriform gland spigots; PMS with spigots situated on distal half of segment, one minor ampullate gland spigot (mAP), 25 aciniform gland spigots (AC), and two cylindrical gland spigots (CY); PLS with second segment about the same length as the first segment, with 37 aciniform gland spigots, and two cylindrical gland spigots.

Male: Medium sized spider (8.9 mm), much longer than female. Clypeal height about twice the AME diameter. Chelicerae with many long dense scopula; three promarginal teeth, median one longest; three retromarginal teeth, inner one longest, small condyle at base, and fang shorter than fang width (Fig. 7C). Legs with ring patterns (Fig. 7A, D): formula 4123, similar to female; tarsi with three claws, upper claw with nine pectinated teeth, lower with three; tibia with 15-16 trichobothria in four rows (5p-3d-3d-4r in 1st leg, 3p-3d-5d-5r in 2nd, 3p-5d-4d-4r in 3rd, 3p-6d-4d-3r in 4th), metatarsus three to seven in one row (seven in 1st leg, three in 2nd, six in 3rd, four in 4th), tarsus four to seven in one row (four in 1st leg, six in 2nd and 3rd, seven in 4th). Leg spination (Table 2): 1st leg femur seven spines, tibia with six (2-2-2a on ventral), metatarsus six (2-2-2a on ventral); 2nd femur seven spines, tibia eight (two, 1-1 on retrolateral; six, 2-2-2a on ventral), metatarsus nine (three, 1-0-2 on retrolateral; six, 2-2-2 on ventral); 3rd leg femur seven spines, tibia 12 (six, 1-1 on dorsal, prolateral and retrolateral; six, 2-2-2a on ventral), metatarsus 16 (four, 0-

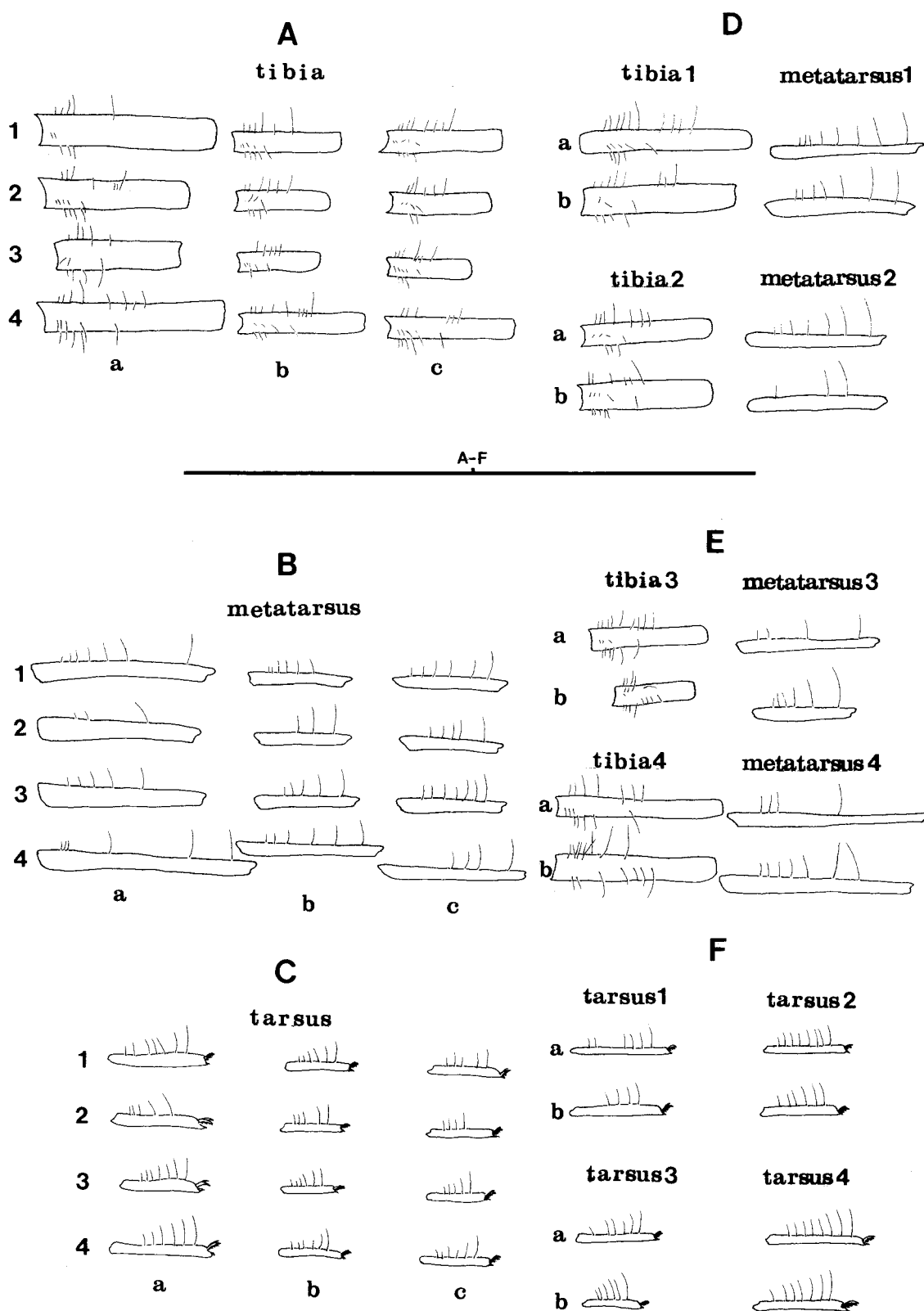


Fig. 9. Diagram of trichobotrium patterns on the left legs of the *Asiacoelotes songminjiae* species complex in Korea. Note. A, Female, tibia, dorsal view; B, Female, metatarsi, retrolateral view; C, Female, tarsi, retrolateral view; D, Male, tibia, dorsal view; E, Male, metatarsi, retrolateral view; F, Male, tarsi, retrolateral view; a, *Asiacoelotes songminjiae*; b, *Asiacoelotes insidiosus*; 1, 1st leg; 2, 2nd leg; 3, 3rd leg; 4, 4th leg. Scale bar = 10 mm (A-F).

2-2 on dorsal; six, 1-1-1 on prolateral and retrolateral; six, 2-2-2 on ventral), tarsus one (0-1-0 on retrolateral); 4th leg femur six spines, tibia 12 (six, 1-1 on dorsal, prolateral and retrolateral; six, 2-2-2a on ventral), metatarsus 16 (four, 0-2-2 on dorsal; six, 1-1-1 on prolateral and retrolateral; six, 2-2-2 on ventral), tarsus without spines.

Male pedipalp with one long patellar apophysis (Figs. 7F-H, 8C); retrolateral tibial apophysis (RTA) long, about the same length as tibia, broadly extended beyond (Figs. 7F-G, 8C); intermediate tibial apophysis (ITA) small (Figs. 7F-H, 8C); cymbial furrow very elongated, about three-fifths the cymbium length, well developed concave without projecting point on upper (Fig. 7F-H); conductor long, slender, lower bent and becomes wider (Fig. 7F-G); conductor dorsal apophysis absent (Fig. 7E-G); conductor lamella large, modified with many small setae (Fig. 7E-F); embolus posterior in origin and extremely long linear with knife-shaped apex (Figs. E-G, 8D); median apophysis spoon-like, interior semicircular projection in middle with distal end pointed (Figs. 7F-G, 8B).

Material examined in Korea: 2, 1, small pine forest (about 20m²) on Naksan beach, Gangwon-do, 19-February-2005, 1, 10, 29-April-2005; 2, Ggogji beach, Chungcheongnam-do, 23-April-2005.

Distribution: Korea, Japan.

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