

TWO NEW PURSE-WEB SPIDERS OF THE GENUS *ATYPUS* (ARANEAE, ATYPIDAE) FROM KOREA

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ABSTRACT. Two new species of the genus *Atypus*, *Atypus sternosulcus* new species from Andong and *A. suwonensis* new species from Suwon, are newly described from Korea.

Keywords: Purse-web, *Atypus sternosulcus*, *Atypus suwonensis*, Asia, taxonomy

Spiders of the genus *Atypus* are known as purse-web spiders as they construct silk-lined tunnels in the ground that extend above the soil surface, usually against the vertical side of a tree or rock. The tube is covered with sand and debris and is difficult to detect. Males are active mostly from June to August, and females then guard their egg sacs during August and September (Schwendinger 1990). Mating takes place inside the tube and the spiders stay together for several months, after which the male dies or is eaten by the female (Im & Kim 2000). Females of these primitive spiders may live for several years.

Worldwide, 19 species of the genus *Atypus* have been recorded from the United States, Europe and south-east Asia (Platnick 2004). Three species have been described from Korea: *A. coreanus* Kim 1985, *A. magnus* Namkung 1986 and *A. quelpartensis* Namkung 2001 (Kim 1985; Namkung 1986, 2001). Atypid spiders are characterized by a male sternum with marginal ridges, a short, straight and spike-like embolus, a straight conductor and a distally widened vulva with bulbous or pyriform receptacula and with two lateral patches of pores on the genital atrium (Gertsch & Platnick 1980). Kraus & Baur (1974) utilized various taxonomic characters to distinguish between the European species, such as the segmentation of the posterior spinnerets, features of the patellar membrane, morphology of sigilla I and IV, and the male palpal conductor, palpal furrow and male metatarsal spines. Schwendinger (1990) noted

and discussed the granular texture on the male chelicerae and front legs, and the cymbial pit for distinguishing species.

METHODS

This paper describes two new atypid spiders, *Atypus sternosulcus* from Giran stream, Andong, Gyeongsangbuk-do and *Atypus suwonensis* from Suwon, Gyeonggi-do in Korea. Male specimens of all Korean atypid spiders were examined, and we reviewed published descriptions to compare taxonomic characters (Kim 1985; Yaginuma 1986; Schwendinger 1990; Chen & Zhang 1991; Song *et al.* 1999; Namkung 1986, 2001). The specimens examined were: *A. karschi*: 1 ♂, 15 August 1995, Kumamoto, Kyusu, Japan, Kim and J. Namkung; *A. coreanus*: 1 ♂, 17 May 1982, Mt. Ungil, Gyeonggi-do, Korea, J. Namkung; *A. magnus*: 1 ♂, 7 June 1986, Jigdong, Gyeonggi-do, Korea, J. Namkung; *A. quelpartensis*: 1 ♂, 4 July 1989, Jungmun, Jeju island, Korea, J. Namkung (Table 1).

The external morphology of the specimens was observed and illustrated utilizing a stereoscopic microscope, and metric characters were measured with an ocular micrometer. All measurements are given in mm. Leg measurements are given in the order of femur, patella + tibia, metatarsus and tarsus, in parentheses. Abbreviations used in this paper are: AER = anterior eye row; PER = posterior eye row; AME = anterior median eye; ALE = anterior lateral eye; PME = posterior median eye; PLE = posterior lateral eye; MOQ = median oc-

Table 1.—Comparisons of taxonomic characters of male of some Asian atypid spiders.

Species	PLS, number of segments	Leg patella, retrolateral face	Sigilla I	Sigilla IV	Conductor, bend in upper corner	Furrow on palpal femur	Spines on metatarsus IV	Granules on femur I (II)	Distribution
<i>A. karschi</i>	4	pigmented	marginal	oval	strong	shallow	present	domed (domed)	Japan China Taiwan
<i>A. heteroptheucus</i>	4	white	remote from margin	oval	medium	shallow	absent	domed (domed)	China
<i>A. coreanus</i>	4	pigmented	marginal	oval	strong	deep	present	domed (domed)	Korea
<i>A. magnus</i>	4	pigmented	marginal	oval	strong	deep	present	smooth (smooth)	Korea Russia
<i>A. quelpartensis</i>	4	white	remote from margin	oval	strong	deep	present	smooth (smooth)	Korea
<i>A. sternosulcus</i>	4	white	marginal	suboval	strong	shallow	present	domed (smooth)	Korea
<i>A. suwonensis</i>	4	white	remote from margin	oval	strong	shallow	present	smooth (smooth)	Korea

ular quadrangle; ALS = anterior lateral spinnerets; PMS = posterior median spinnerets; PLS = posterior lateral spinnerets. The specimens studied are lodged in the deposited in the Laboratory of Insect Ecology, Seoul National University, Seoul, Korea (SNU).

TAXONOMY

Family Atypidae Thorell 1870
Genus *Atypus* Latreille 1804
Atypus sternosulcus new species
Figs. 1–7

Type.—Holotype male, Giran stream, Andong, Korea (36°31'01" N, 128°50'31"E), 3 June 2003, S.T. Kim, H.S. Kim, M.P. Jung and J.H. Lee (SNU).

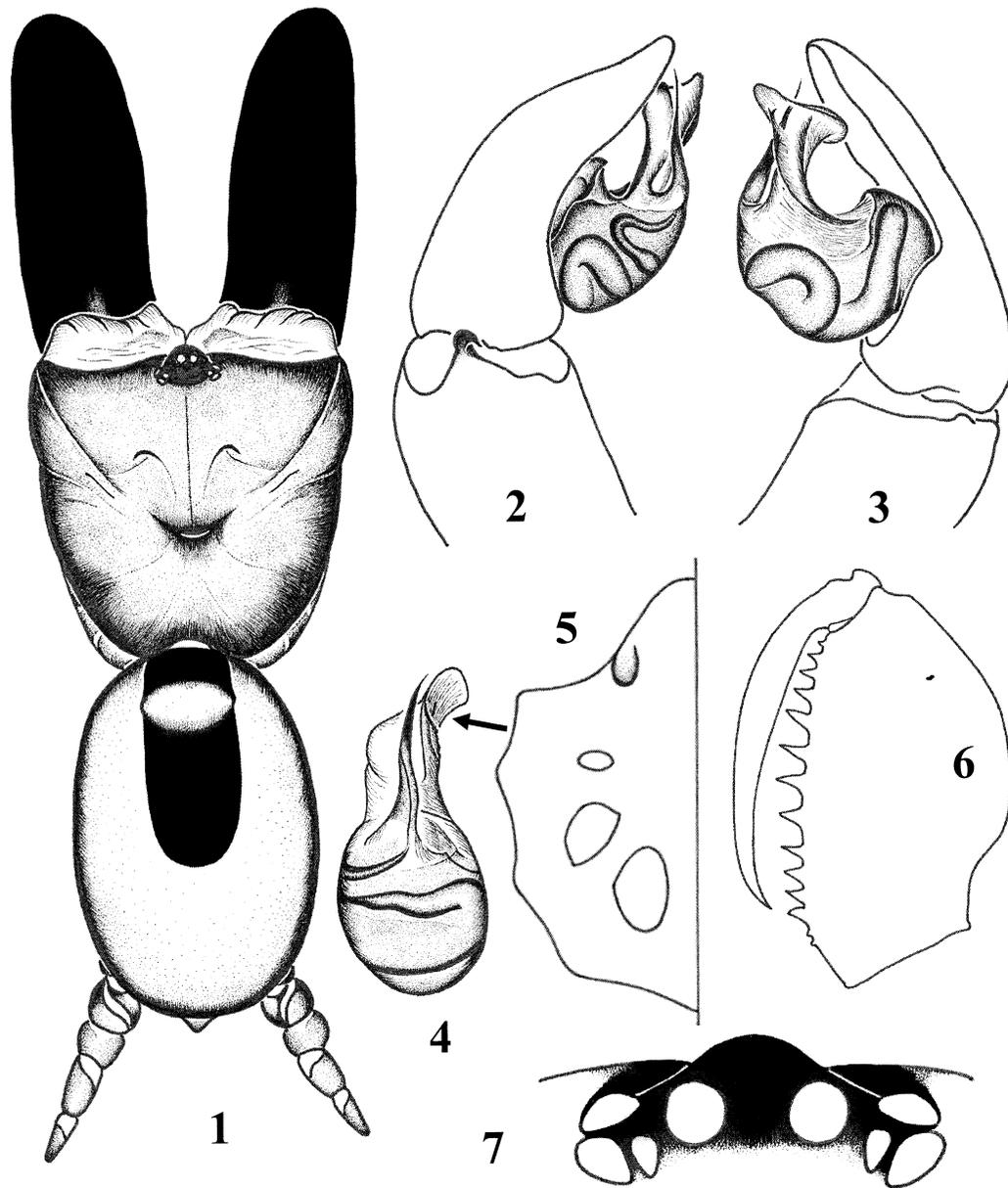
Etymology.—The specific name is a combination of 'stern' from Greek meaning breast and Latin 'sulcus', a furrow or pit, referring to the pit on the sternum of the male holotype.

Diagnosis.—This species is similar to *A. karschi* Dönitz 1887 in general appearance, but differs as follows: the coloration of the abdomen; the chelicera with 12 teeth and 2 denticles on promargin (Fig. 6), instead of 13 in *A. karschi* (Yaginuma 1986, fig. 1e) and their alignment; the shape of vestigial and pitted anterior sternal sigilla (Fig. 5) (*A. karschi*: Yaginuma 1986, fig. 1b); and the shape of upper lateral edge of conductor (Figs. 2–4) (*A. karschi*: Yaginuma 1986: fig. 1p).

Description.—*Male*: Total length 16.5 (in-

cluding chelicerae and excluding spinnerets). Body length 11.7. Carapace 5.1 long, 4.7 wide. Abdomen 6.6 long, 4.2 wide. Chelicerae 5.0 long, 1.7 wide. Endite 2.7 long, 1.9 wide. Labium 0.3 long, 1.1 wide. Sternum 3.4 long, 3.1 wide. AER 1.2, PER 1.3. Leg measurements; I: 14.9 (4.7, 4.5, 3.5, 2.2); II: 12.7 (3.7, 3.9, 3.0, 2.1); III: 12.0 (3.4, 3.5, 2.8, 2.3), IV: 15.2 (4.5, 4.4, 3.5, 2.8); pedipalp 5.8 (2.4, 2.3, -, 1.1).

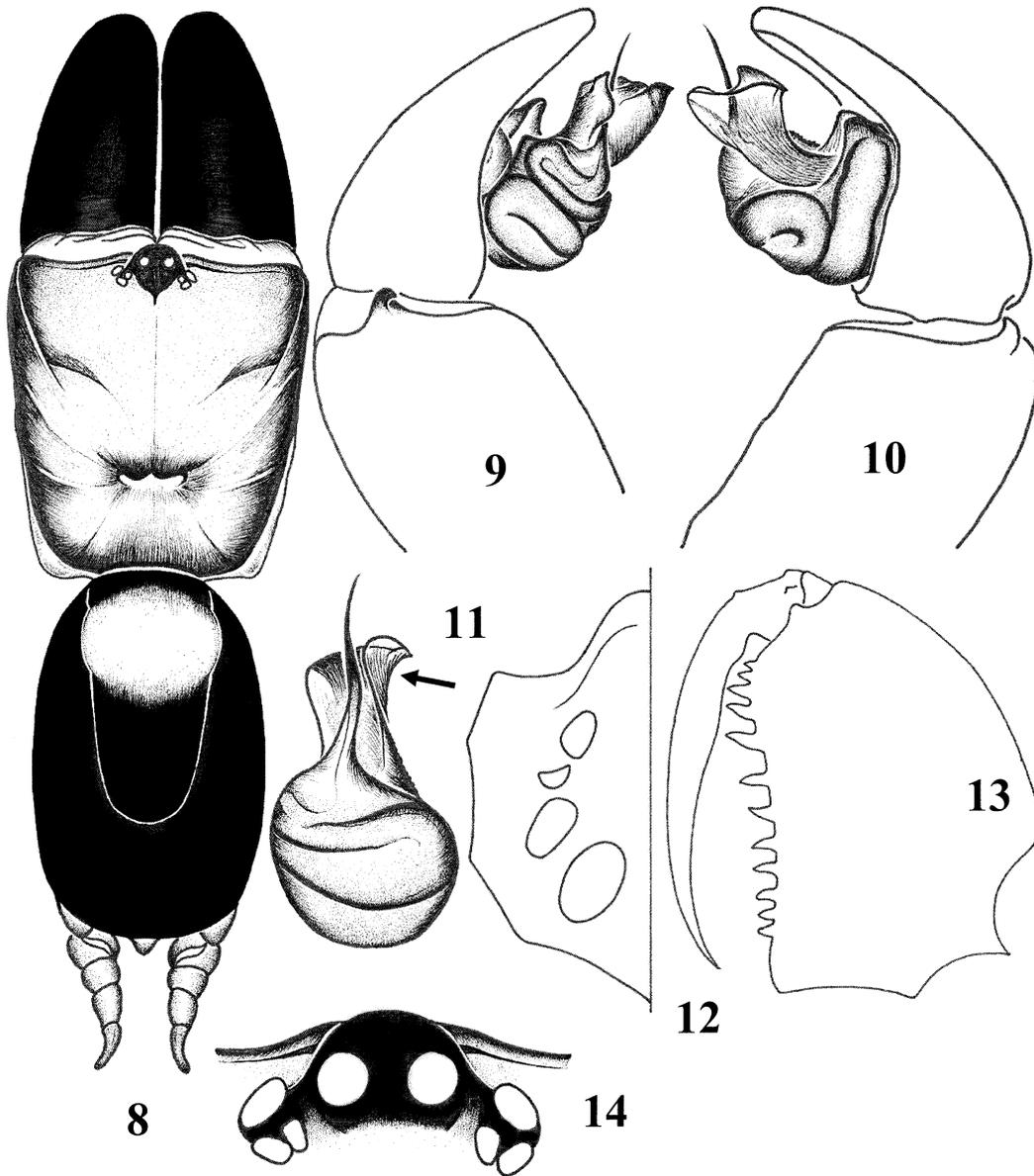
Carapace lustrous and quadrangular, reddish brown with narrow black border, gently narrowed posteriorly; cephalic region dark reddish brown and elevated, lateral margins with black stripes; thoracic region reddish brown, flat, gently rounded on both sides, emarginated posterior margins bearing conspicuous pleurites. Median groove broad weakly U-shaped and deeply imprinted, behind midpoint of carapace, occupying about 1/6 of carapace width at that point; cervical and radial furrows distinct and deeply imprinted (Fig. 1). Eye tubercle black, 0.7 long and 0.8 wide. AER and PER slightly recurved when viewed from above. Eye sizes and interdistances: AME 0.26, ALE 0.23, PME 0.17, PLE 0.20; AME-AME 0.20, AME-ALE 0.07, AME-PLE 0.23, PME-PME 0.63, PME-PLE almost touching, PLE-PLE 0.83, ALE-PLE-PME contiguous. MOQ 0.5 long, front width 0.7 and back width 0.9 (Fig. 7). Chelicerae dark reddish brown, well developed with deep longitudinal furrow at base of retrolateral surface; 12 teeth and 2



Figures 1-7.—*Atypus sternosulcus* new species: 1. Body, dorsal view; 2. Left palp, prolateral view; 3. Left palp, retrolateral view; 4. Left palpal bulb, ventral view; 5. Sternum, left half; 6. Left chelicera, retrolateral view; 7. Eyes, dorsal view, Upper corner of conductor indicated by arrow.

denticles on promargin of cheliceral furrow (Fig. 6); prolateral and retrolateral surface with distinct granular texture. Sternum dark reddish brown with ridges at margins. Four pairs of sigilla deeply imprinted. Anterior sigilla vestigial and deeply pitted between labium and endite. Sigilla sizes and interdistances: I 0.3 long and 0.2 wide, almost touching at mar-

gin, II 0.2 long and 0.3 wide, 0.6 from margin, III 0.6 long and 0.3 wide, 0.5 from margin, IV 0.7 long and 0.5 wide, 0.4 from margin; I-I 1.1, II-II 1.5, III-III 1.3, IV-IV 0.5, I-II 0.6, II-III 0.3, III-IV 0.2 (Fig. 5). Endite and labium dark reddish brown. Legs 4123, dark reddish brown and armed with short spines; prolateral side of femur I with granular tex-



Figures 8–14.—*Atypus suwonensis* new species. 8. Body, dorsal view; 9. Left palp, prolateral view; 10. Left palp, retrolateral view; 11. Left palpal bulb, ventral view; 12. Sternum, left half; 13. Left chelicera, retrolateral view; 14. Eyes, dorsal view, Upper corner of conductor indicated by arrow.

ture; tarsi light reddish brown and pseudosegmented; retrolateral membranous area on patella I without pigments; trichobothria in two distally convergent rows on basal 2/3 tibiae I–IV (left): 4 + 6, 5 + 6, 5 + 5, 6 + 6 and in single row on distal half of metatarsi I–IV: 3, 3, 3, 4. Abdomen suboval and dull grayish brown; dorsal scutum (3.8 long and 2.0 wide)

blackish gray enclosing dull blackish gray tergite (Fig. 1); lung patches light grayish brown. Spinnerets light blackish gray. ALS 0.5; PMS 0.9; PLS 4 segmented: basal joint 0.6, median 0.7, subapical 0.7, apical 0.5. Pedipalp dark reddish brown; palpal cymbium without basal pit; palpal femur without furrow; bulb small and globe-like; embolus short and stout,

spine-shaped; upper distal corner of conductor slightly bent upwards (Figs. 2–4).

Female: Unknown.

Distribution.—Korea (Giran stream, Andong, Gyeongsangbuk-do).

Ecological remarks.—The sole specimen was collected in a pitfall trap near a stream beside a hillock.

Atypus suwonensis new species

Figs. 8–14

Type.—Holotype male, Seodung-dong, Suwon, Korea (37°15'41"N, 126°59'16"E), 24 June 2000, T.W. Kim (SWU).

Etymology.—The specific name is an adjective referring to the type locality.

Diagnosis.—This species is similar to *Atypus coreanus* Kim 1985 in general appearance, but differs as follows: the alignment of cheliceral promarginal teeth (Fig. 13) (*A. coreanus*: Kim 1985: 6, figs. 1–3); the shape of upper lateral edge of conductor (Figs. 9–11) (*A. coreanus*: Kim 1985: p. 6, fig. 7; Namkung 2001; p. 25, figs. b–c).

Description.—*Male*: Total length 14.7 (including chelicerae and excluding spinnerets). Body length 10.6. Carapace 5.0 long, 4.9 wide. Abdomen 5.6 long, 3.6 wide. Chelicerae 4.8 long, 1.8 wide. Endite 2.8 long, 1.7 wide. Labium 0.3 long, 1.1 wide. Sternum 3.7 long, 3.4 wide. AER 1.3, PER 1.4. Leg measurements; I: 13.7 (4.6, 4.2, 3.0, 1.9); II: 12.0 (3.7, 3.6, 2.5, 2.2); III: 10.8 (3.2, 3.1, 2.6, 1.9), IV: 14.2 (4.1, 3.9, 3.6, 2.6); pedipalp 5.3 (2.1, 2.1, -, 1.1).

Carapace lustrous and quadrangular, reddish brown with narrow black border, gently narrowed backward; cephalic region dark reddish brown and elevated, margined by black stripes; thoracic region reddish brown and flat, gently rounded on both sides, emarginated posterior margins bearing conspicuous pleurites. Median groove weakly W-shaped and deeply imprinted, positioned at about 2/3 of carapace length, occupying about 1/5 of carapace width at that point; cervical and radial furrows distinct and deeply imprinted (Fig. 8). Eye tubercle black, 0.8 long and 0.7 wide. AER and PER slightly recurved from the above. Eye sizes and interdistances: AME 0.26, ALE 0.23, PME 0.17, PLE 0.18; AME-AME 0.20, AME-ALE 0.10, AME-PLE 0.26, PME-PME 0.73, PME-PLE almost touching, PLE-PLE 1.02, ALE-PLE-PME contiguous.

MOQ 0.6 long, front width 0.7 and back width 1.0 (Fig. 14). Chelicerae dark reddish brown, well developed with deep longitudinal furrow at base of retrolateral surface; 12 teeth on promargin of cheliceral furrow (Fig. 13); prolateral and retrolateral surface with distinct granular texture. Sternum dark reddish brown with ridges at margins. Four pairs of sigilla deeply imprinted. Sigilla sizes and interdistances: I 0.6 long and 0.4 wide, 0.7 from the margin, II 0.3 long and 0.4 wide, 0.6 from the margin, III 0.6 long and 0.4 wide, 0.5 from the margin, IV 0.7 long and 0.6 wide; I-I 0.9, II-II 1.4, III-III 1.4, IV-VI 0.4, I-II 0.06, II-III 0.03, III-IV 0.09 (Fig. 12). Endite and labium dark reddish brown. Legs 4123, dark reddish brown and armed with short spines; prolateral side of femur I with granular texture; tarsi light reddish brown and pseudosegmented; retrolateral membranous area on patella I without pigments; trichobothria in two distally convergent rows on basal 2/3 tibiae I-IV (left): 6 + 7, 6 + 6, 5 + 5, 6 + 6 and in single row on distal half of metatarsi I-IV: 4, 3, 3, 7. Abdomen suboval and dull black; dorsal scutum (4.0 long and 2.1 wide) blackish brown enclosing yellowish brown tergite (Fig. 8); lung patches light grayish brown. Spinnerets light blackish gray. ALS 0.5; PMS 0.9; PLS 4 segmented: basal joint 0.6, median 0.8, subapical 0.7, apical 0.6. Pedipalp dark reddish brown; palpal cymbium without basal pit; palpal femur without furrow; bulb small and globe like; embolus short and stout spine-shaped; upper distal corner of conductor conspicuously bent upwards (Figs. 9–11).

Female.—Unknown.

Distribution.—Korea (Suwon, Gyeonggi-do).

Ecological remarks.—The sole specimen was collected in a pitfall trap.

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