

# Three Species of the Genus *Walckenaeria* (Araneae: Linyphiidae) New to Korea

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## 코뿔애접시거미속 (거미목: 접시거미과)의 3 한국미기록종

서보근\*

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**ABSTRACT:** Three species of the linyphiid genus *Walckenaeria*, *Walckenaeria chikunii* Saito and Ono, 2001, *Walckenaeria furcillata* (Menge, 1869), and *Walckenaeria ichifusaensis* Saito and Ono, 2001, are reported new to the Korean spider fauna. *W. furcillata* is widely distributed throughout the Palearctic region, but *W. chikunii* and *W. ichifusaensis* are only known from their type localities in Japan. Photographs and illustrations of the diagnostic characters are provided.

**Key words:** Linyphiidae, Korea, *Walckenaeria chikunii*, *Walckenaeria furcillata*, *Walckenaeria ichifusaensis*

**초록:** 코뿔애접시거미속 (*Walckenaeria*)의 3종, 내장애접시거미 (*Walckenaeria chikunii*), 북방애접시거미 (*Walckenaeria furcillata*), 계곡애접시거미 (*Walckenaeria ichifusaensis*), 를 한국미기록종으로 보고한다. 북방애접시거미 (*W. furcillata*)는 구북구에 널리 분포하고 있으나, 내장애접시거미 (*W. chikunii*)와 계곡애접시거미 (*W. ichifusaensis*)는 일본내의 모식산지에서만 알려져 있다. 사진과 진단형질의 그림을 첨부하였다.

**검색어:** 접시거미과, 한국, 내장애접시거미, 북방애접시거미, 계곡애접시거미

The genus *Walckenaeria* is a large group in the spider family Linyphiidae that is defined by the elongated cephalothorax, the stout teeth on the tarsal claws, and the wide and loosely coiled embolus (Holm, 1984). Spiders belonging to this genus live mostly at ground level, although some may move up to low shrubs (Millidge, 1983).

A total of 198 species of the genus *Walckenaeria* have been recorded from all over the world, including 86 species listed in the Palearctic region (Platnick, 2013). Four species, such as *Walckenaeria antica* (Wider, 1834), *Walckenaeria capito* (Westring, 1861), *Walckenaeria coreana* (Paik, 1983), and *Walckenaeria ferruginea* Seo, 1991, have been recorded from

Korea (Namkung et al., 2009; Platnick, 2013). *W. ferruginea* was synonymized with *W. orientalis* after the examination of the original illustrations by Marusik and Koponen (2000) but was later removed from synonymy with *W. orientalis* and re-established as a valid species name by Song and Li (2011). While examining specimens collected during the Korean indigenous species survey, three species of *Walckenaeria*, *W. chikunii* Saito and Ono, 2001, *W. furcillata* (Menge, 1869), and *W. ichifusaensis* Saito and Ono, 2001, previously described but new to Korea, were identified. *W. furcillata* is widely distributed throughout the Palearctic region, but *W. chikunii* and *W. ichifusaensis* are only known from their type localities in Nagano and Kumamoto, Japan, respectively (Saito and Ono, 2001; Platnick, 2013).

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## Materials and Methods

Specimens were examined and measured under a stereomicroscope (Leica S8APO, Singapore). The photographs were taken with digital camera (Leica DFC 420) and the images were combined using image stacking software (i-Solution, Future Science Co. Ltd., Taejeon, Korea).

The following abbreviations are used in the text and figures: Somatic morphology - c, carapace length; Tm, position of the trichobothrium on tibia; Leg I, length of leg I; Fem. I, length of femur I; Tib. I, length of tibia I; Met. I, length of metatarsus I; Tar. I, length of tarsus I. The sequence of leg segments in the measurement data is as follows: total (femur, patella, tibia, metatarsus, tarsus). Eye area - AME, anterior median eye; ALE, anterior lateral eye; PME, posterior median eye; PLE, posterior lateral eye; AER, anterior eye row; PER, posterior eye row; AME-AME, distance between AMEs; PME-PME, distance between PMEs; AME-ALE, distance between AME and ALE; PME-PLE, distance between PME and PLE; ALE-PLE, distance between ALE and PLE; MOQ, median ocular quadrangle. Male palp - DSA, distal suprategular apophysis; E, embolus; M, membrane; PC, paracymbium; PTA, prolateral tibial apophysis; R, radix; RTA, retrolateral tibial apophysis; SPT, suprategulum; ST, subtegulum; T, tegulum; TP, tailpiece of radix. Epigynum - DP, dorsal plate; VP, ventral plate.

All measurements in the text are in millimeters. The examined materials are deposited in the National Institute of Biological Resources (NIBR) of Ministry of Environment of Korea.

## Taxonomic accounts

### Family Linyphiidae Blackwall, 1859

#### Genus *Walckenaeria* Blackwall, 1833

*Walckenaeria* Blackwall, 1833: 105. Type species: *W. acuminata* Blackwall, 1833: 106.

The female carapace is usually unmodified. The male carapace usually has a cephalic lobe carrying the posterior median eyes. The male of many species has modified hairs on the cephalic lobe and the anterior head. The chelicera has a file on the lateral margin. All of the metatarsi have a trichobothrium. The palpal

tibia of both sexes has three trichobothria and dorsally it is extended into one or two apophyses in the male. The paracymbium is a simple horseshoe shape. The embolic division of the palp comprises a coiled embolus of about 1.5-2 turns (Millidge, 1983; Holm, 1984).

#### Key to the male of the genus *Walckenaeria* in Korea

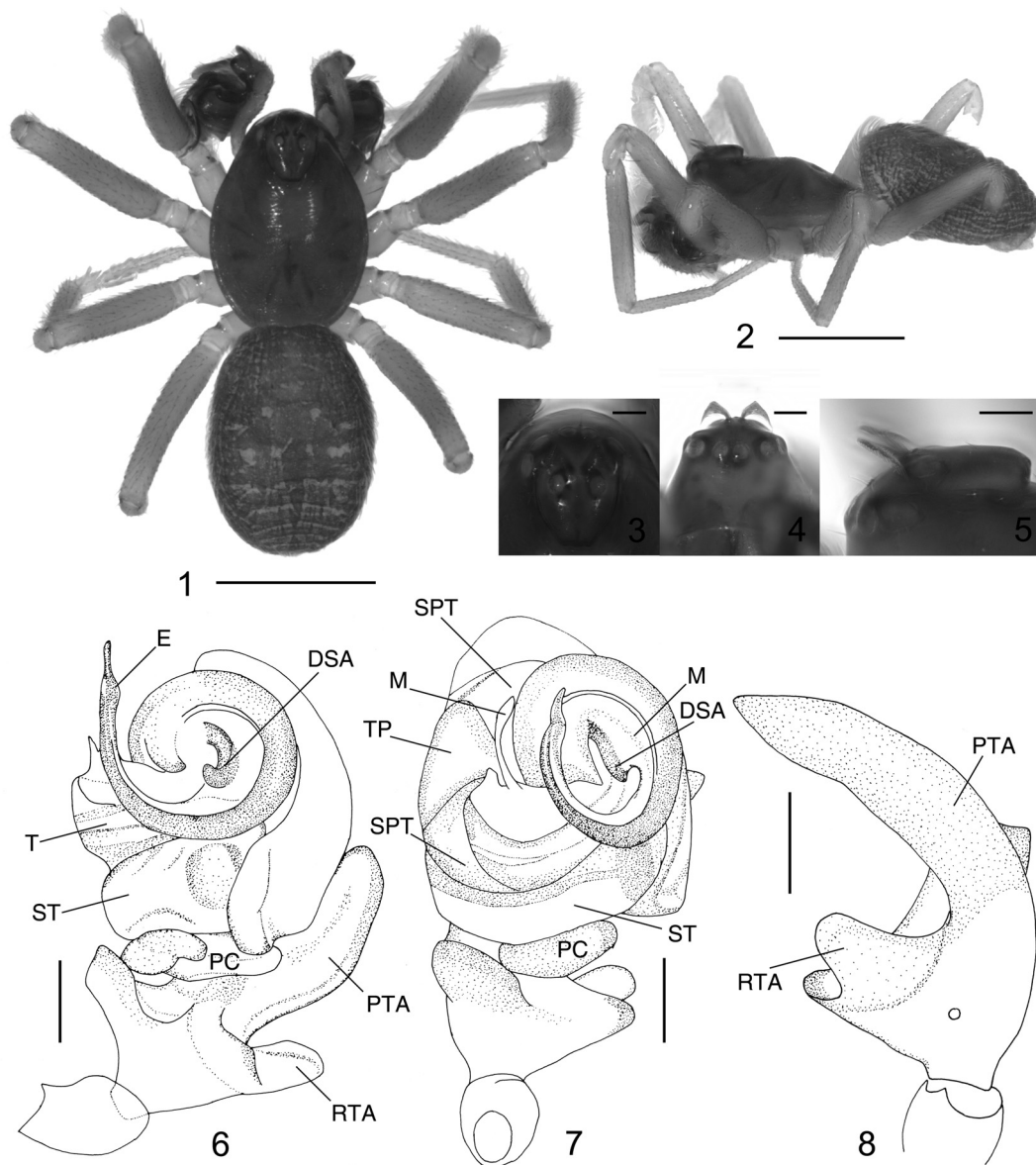
1. Carapace with a well-developed lobe bearing PMEs ..... 2
- Carapace without a well-developed lobe bearing PMEs ..... 4
2. Lobe on cephalon round-shaped ..... 3
- Lobe on cephalon elongated, bent anteriorly ..... *W. furcillata*
3. Cephalon with a pair of horns directed anteriorly ..... *W. antica*
- Cephalon without a pair of horns ..... *W. capito*
4. Cephalon with a pair of processes ..... 5
- Cephalon without a pair of processes ..... *W. coreana*
5. Cephalic processes with bristles on distal parts ..... *W. ferruginea*
- Winglike cephalic processes ..... 6
6. Tibia with a retrolateral apophysis ..... *W. chikunii*
- Tibia without a retrolateral apophysis ..... *W. ichifusaensis*

#### *Walckenaeria chikunii* Saito and Ono, 2001 내장에접시거미 (신칭) (Figs. 1-8)

*Walckenaeria chikunii* Saito and Ono, 2001: 26; Ono et al., 2009: 286.

**Diagnosis.** This species is very similar to *W. ichifusaensis* Saito and Ono, 2001 at first appearance but can be easily distinguished from the latter by the flat head with a pair of wing-like processes between PMEs (Figs. 2-5) and palpal tibia with a retrolateral apophysis (Fig. 8)

**Description.** Male: Carapace reddish brown; radiating lines



**Figs. 1-8.** Male of *Walckenaeria chikunii* Saito and Ono, 2001: 1. dorsal view; 2. lateral view; 3. cephalon, dorsal view; 4. cephalon, frontal view; 5. cephalon, lateral view; 6. left palp, retrolateral view; 7. left palp, ventral view; 8. palpal tibia, dorsal view. Scale lines: 0.5 mm (1-2), 0.1 mm (3-8).

and median furrow distinct (Fig. 1); cephalic region elevated evenly with a pair of wing-like processes between PME and a sulcus on each side (Fig. 5). Clypeus height 4.5 times of diameter of AME. AER recurved and PER procurved in dorsal view. Eye ratio, PLE > ALE > PME > AME (7:5:4.5:4). MOQ, height > posterior side > anterior side (18.5:14:10). Chelicerae with six promarginal and four retromarginal teeth. Sternum and labium reddish brown. Legs yellowish brown. Leg I/c 3.02. Fem. I/c 0.88. Tib. I/c 0.80. Met. I/c 0.63. Met. I/tar. I 1.42. Tibial chaetotaxy 2-2-1-1. Tm I 0.44, II 0.41, III 0.40 and

IV -. Abdomen oval; dorsum dark brown with several transverse stripes posteriorly; venter dark yellow. Palpal tibia with a long curved prolateral apophysis and a stout retrolateral apophysis (Fig. 8). Tegulum with a narrow membrane at its distal part (Fig. 7). Embolic division with a coiled embolus of 1.5 turns (Fig. 6).

**Measurements.** Body length 2.25; carapace length 1.13, width 0.79; cephalic width 0.55; sternum length 0.73, width 0.59; labium length 0.12, width 0.17; anterior eye row 0.31; posterior eye row 0.35; AME-AME 0.01; AME-ALE 0.03;

PME-PME 0.07; PME-PLE 0.07; ALE-PLE contiguous; abdomen length 1.20, width 0.85. Leg I 3.41 (1.00, 0.30, 0.90, 0.71, 0.50), II 3.21 (0.95, 0.30, 0.78, 0.68, 0.50), III 2.77 (0.80, 0.28, 0.65, 0.61, 0.43), IV - (1.00, 0.28, -, -, -).

**Material examined.** 1 male, Naejang-dong, Jeongeup-si, Jeollabuk-do (35°29'41"N, 126°54'13"E), 14. v. 2006, S. Y. Kim.

**Distribution.** Korea, Japan.

**Remarks.** This species is very rare; female is unknown.

***Walckenaeria furcillata* (Menge, 1869) 북방애접시거미(신칭) (Figs. 9-19)**

*Phalops furcillatus* Menge, 1869: 220.

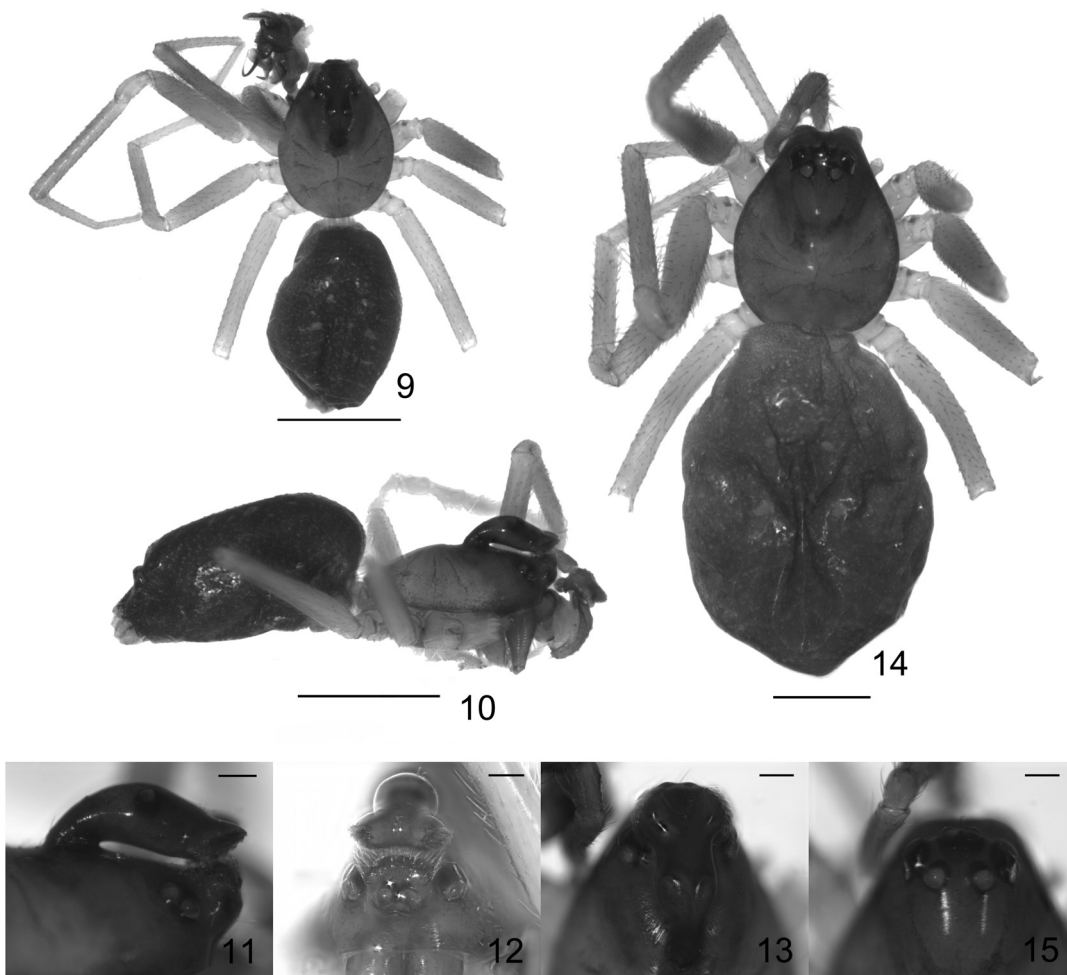
*Walckenaeria furcillata*: Cambridge, 1873: 548; Merrett, 1963:

427; Wunderlich, 1972: 390; Holm, 1984: 137; Roberts, 1987: 32; Tanasevitch, 1990: 109; Heimer and Nentwig, 1991: 268; Ono et al., 2009: 286; Pajunen et al., 2009: 79.

*Tigellinus furcillatus* : Simon, 1884: 839; Locket and Millidge, 1953: 204; Wiehle, 1960: 176.

**Diagnosis.** This species belongs to the subgenus *Tigellinus*, of which the synapomorphic character is the elongate cephalic lobe in the male, arising from the posterior part of the head and extending horizontally forwards to the front of the head (Holm, 1984). Accordingly, this species is similar to the other consubgeneric species at first appearance but can be distinguished by the stout cephalic lobe separated from the head by a rather wide slit (Fig. 11) and a blunt retrolateral tibial apophysis (Fig. 18).

**Description.** Male: Carapace yellowish brown, darker in

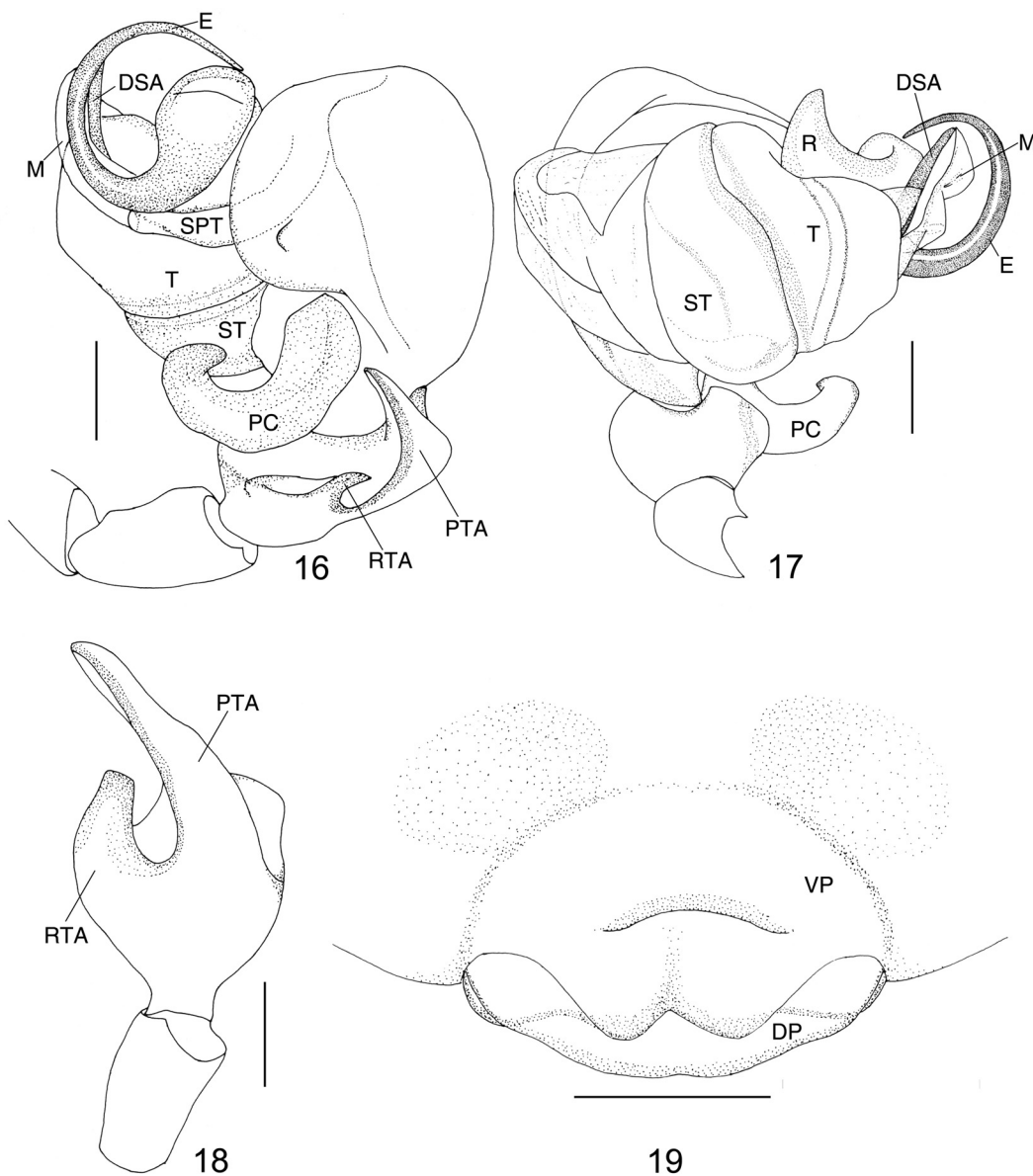


**Figs. 9-15.** *Walckenaeria furcillata* (Menge, 1869): 9. male, dorsal view; 10. male, lateral view; 11. male cephalon, lateral view; 12. male cephalon, frontal view; 13. male cephalon, dorsal view; 14. female, dorsal view; 15. female cephalon, dorsal view. Scale lines: 0.5 mm (9-10, 14), 0.1 mm (11-13, 15).

cephalic region, with radiating and median line distinct (Fig. 9); cephalic region with a long bent furcated lobe and a small lobe behind AMEs (Figs. 10-12). Clypeus height 3 times of diameter of AME. AER recurved in dorsal view. Eye ratio,  $ALE > PLE > PME = AME$  (6.5:6:4). MOQ, height > posterior side > anterior side (36:15:9). Chelicerae with four promarginal and three retromarginal teeth. Sternum reddish brown with dark margin. Labium dark brown, fine reticulate pattern on yellow ground. Legs yellowish brown. Leg I/c 3.43. Fem. I/c 0.92. Tib. I/c 0.90. Met. I/c 0.82. Met. I/tar. I 1.51. Met. IV/tar.

IV 1.86. Tibial chaetotaxy 2-2-1-1. Tm I 0.44. II 0.49, III 0.42 and IV 0.59. Abdomen oval and dark. Palpal tibia with a long pointed apophysis and a short blunt one (Fig. 18). Distal suprategular apophysis well developed. Embolic division with a coiled embolus of about one turn (Figs. 16-17).

Female: Cephalic region unmodified (Fig. 14). General appearance similar to male. Clypeus height 2.2 times of diameter of AME. AER recurved and PER procurved in dorsal view (Fig. 15). Eye ratio,  $ALE > PME > AME = PLE$  (6.5:6:5). MOQ, posterior side > height > anterior side (17.5:17:10). Chelicerae



**Figs. 16-19.** *Walckenaeria furcillata* (Menge, 1869): 16. left palp of male, retrolateral view; 17. left palp of male, ventral view; 18. male palpal tibia, dorsal view; 19. female epigynum, ventral view. Scale lines: 0.1 mm (16-19).

with three promarginal and six retromarginal teeth. Fem. I/c 1.05. Tib. I/c 0.92. Met. I/c 0.85. Tm I 0.49, II 0.48, III 0.45 and IV -. Epigynum with a transverse depression on ventral plate, a wide dorsal plate and a pair of genital openings on both sides (Fig. 19).

**Measurements.** Male/female: Body length 2.60/2.80; carapace length 1.20/1.03, width 0.88/0.83; cephalic width 0.60/0.55; sternum length 0.65/0.62, width 0.59/0.59; labium length 0.14/0.14, width 0.20/0.20; anterior eye row 0.42/0.35; posterior eye row 0.42/0.36; AME-AME 0.02/0.02; AME-ALE 0.13/0.04; PME-PME 0.10/0.08; PME-PLE 0.25/0.04; ALE-PLE contiguous/contiguous; abdomen length 1.58/1.85, width 0.85/1.28. Leg I 4.11/- (1.10/1.08, 0.30/0.31, 1.08/0.95, 0.98/0.88, 0.65/-), II 3.82/3.72 (1.03/1.05, 0.28/0.31, 1.03/0.93, 0.90/0.83, 0.58/0.60), III 3.24/3.11 (0.88/0.90, 0.30/0.28, 0.78/0.75, 0.78/0.73, 0.50/0.45), IV 4.51/- (1.40/1.15, 0.30/-, 1.15/-, 1.08/-, 0.58/-).

**Material examined.** 1 male, 2 females, Cheokcheon-ri, Jinbu-myeon, Pyeongchang-gun, Gangwon-do (37°41'24"N, 128°30'14"E),

20. vii. 2010, J. C. Lim.

**Distribution.** Palearctic region.

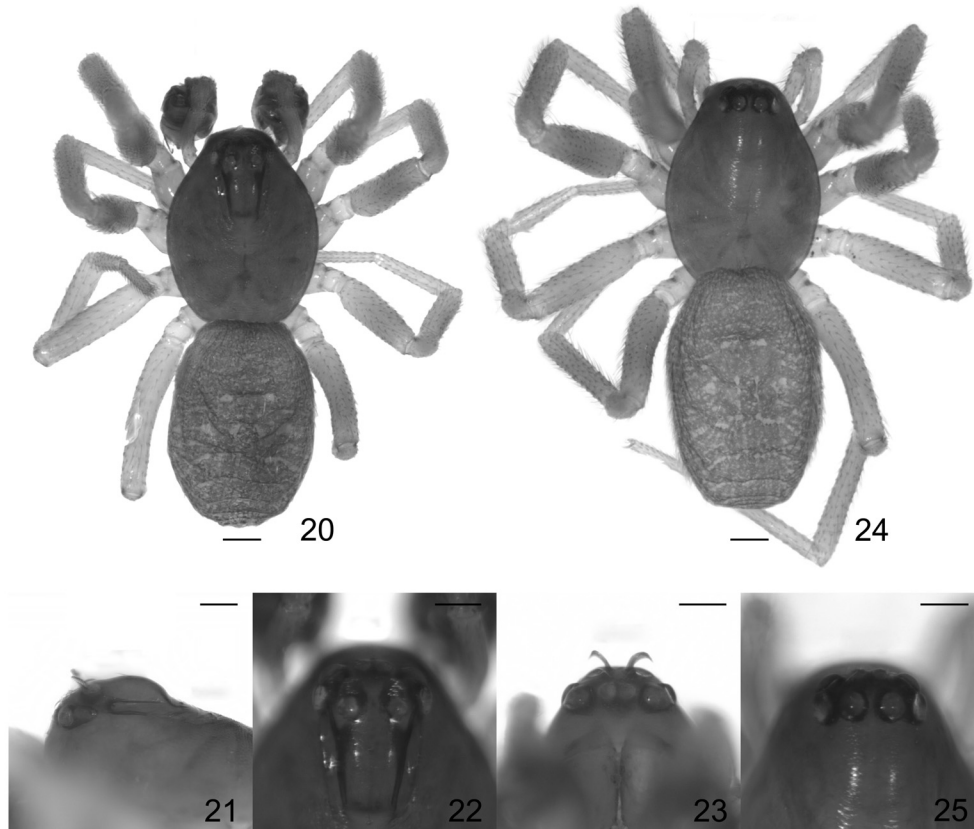
**Remarks.** This species is well-known in the European spider fauna but was recently found in Japan and Korea (Platnick, 2013).

***Walckenaeria ichifusaensis* Saito and Ono, 2001 계곡에접시 거미(신칭) (Figs. 20-29)**

*Walckenaeria ichifusaensis* Saito and Ono, 2001: 24; Ono et al., 2009: 286.

**Diagnosis.** This species is similar to *W. chikunii* as it has a pair of wing-like cephalic processes and a elongate prolateral tibial apophysis but is easily distinguished from the latter by the shape of the cephalic processes and cephalon, palpal tibia with a small distal process, a well-developed sulcus on the each side of the cephalon, and the twisted tip of embolus (Figs. 21, 23, 26-28).

**Description.** Male: Carapace reddish yellow with radiating and



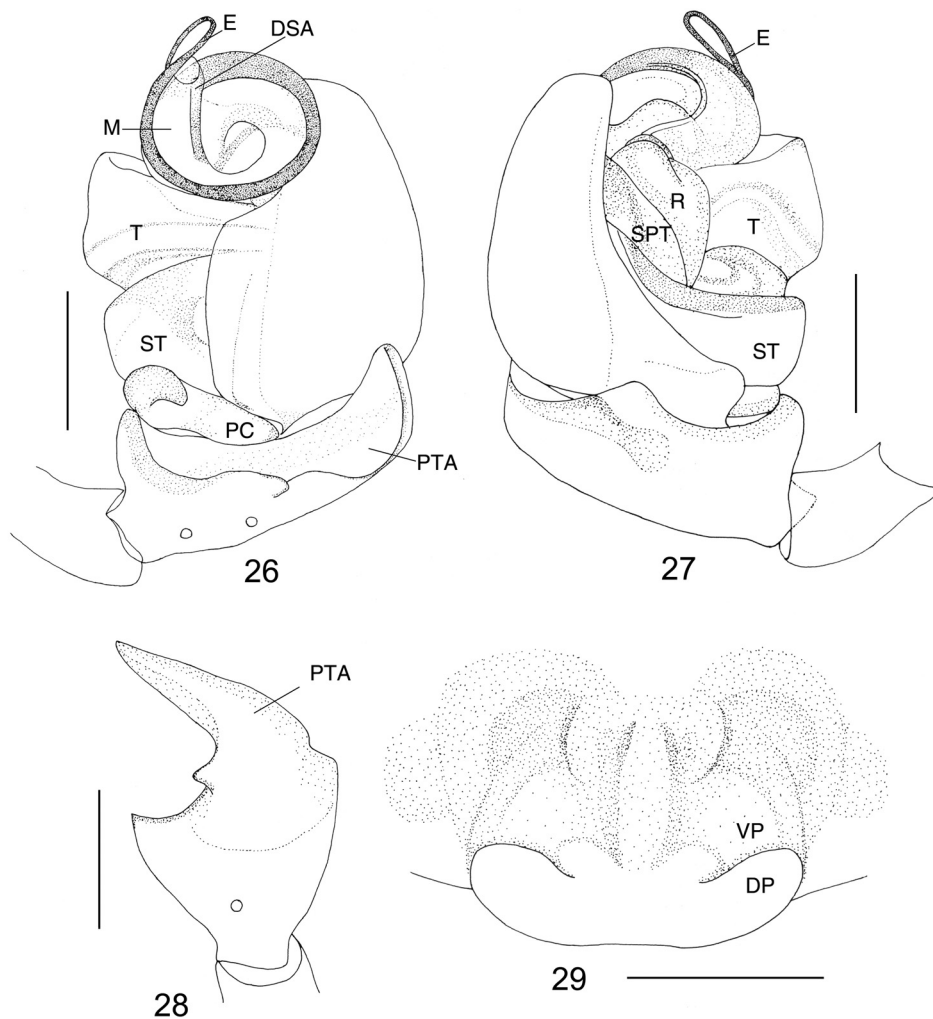
**Figs. 20-25.** *Walckenaeria ichifusaensis* Saito and Ono, 2001: 20. male, dorsal view; 21. male cephalon, lateral view; 22. male cephalon, dorsal view; 23. male cephalon, frontal view; 24. female, dorsal view; 25. female cephalon, dorsal view. Scale lines: 0.1 mm (20-25).

median line distinct (Fig. 20); cephalic region elevated with a pair of eyebrow-like processes between PME's and a well-developed sulcus on the each side (Figs. 21-23). Clypeus height 3 times of diameter of AME. AER recurved slightly and PER procurved slightly in dorsal view. Eye ratio, ALE = PLE > PME > AME (5:4:3). MOQ, height > posterior side > anterior side (12:11:6). Chelicerae with three teeth on both margins of fang furrow. Sternum and labium reddish yellow. Legs yellow. Leg I/c 2.69. Fem. I/c 0.78 Tib. I/c 0.65. Met. I/c 0.51. Met. I/tar. I 1.11. Met. IV/tar. IV 1.26. Tibiae without spines. Tm I 0.40. II 0.37, III 0.35 and IV 0.39. Abdomen oval and pale dark yellow. Palpal tibia with an elongated apophysis having a small process on its distal part. Distal suprategular apophysis well developed. Embolic division with a coiled embolus of about

one turn; tip of embolus twisted (Figs. 26-27).

Female: Cephalic region unmodified (Fig. 24). General appearance similar to male. Clypeus height 2.6 times of diameter of AME. AER recurved and PER straight in dorsal view (Fig. 25). Eye ratio, ALE = PLE > PME > AME (5:4.5:3.5). MOQ, height > posterior side > anterior side (11.5:10.5:8). Chelicerae with five teeth on both margins. Leg I/c 2.83. Fem. I/c 0.83. Tib. I/c 0.68. Met. I/c 0.56. Met. I/tar. I 1.26. Met. IV/tar. IV 1.61. Tibiae without spines. Tm I 0.37. II 0.33, III 0.33 and IV 0.36. Epigynum with a wide dorsal plate and a pair of genital openings both sides (Fig. 29).

**Measurements.** Male/female: Body length 1.50/1.75; carapace length 0.78/0.88, width 0.58/0.63; cephalic width 0.40/0.43; sternum length 0.53/0.59, width 0.43/0.46; labium length



**Figs. 26-29.** *Walckenaeria ichifusaensis* Saito and Ono, 2001: 26. left palp of male, retrolateral view; 27. left palp of male, prolateral view; 28. male palpal tibia, dorsal view; 29. female epigynum, ventral view. Scale lines: 0.1 mm (26-29).

0.08/0.08, width 0.14/0.15; anterior eye row 0.23/0.23; posterior eye row 0.26/0.26; AME-AME contiguous/0.02; AME-ALE 0.02/0.01; PME-PME 0.05/0.03; PME-PLE 0.04/0.02; ALE-PLE contiguous/contiguous; abdomen length 0.75/1.00, width 0.63/0.63. Leg I 2.10/2.49 (0.61/0.73, 0.22/0.28, 0.51/0.60, 0.40/0.49, 0.36/0.39), II 2.03/2.36 (0.59/0.68, 0.22/0.28, 0.48/0.53, 0.39/0.48, 0.35/0.39), III 1.65/1.97 (0.48/0.55, 0.17/0.23, 0.36/0.43, 0.33/0.43, 0.31/0.33), IV 2.24/2.57 (0.61/0.70, 0.21/0.25, 0.56/0.68, 0.48/0.58, 0.38/0.36).

**Material examined.** 1 male, 3 females, Naejang-dong, Jeongeup-si, Jeollabuk-do (35°29'16"N, 126°53'56"E), 13. v. 2006, S. Y. Kim. 1 female, Sannae-myeon, Namwon-si, Jeollabuk-do (35°22'06"N, 127°34'19"E), 1. x. 2009, S. Y. Kim.

**Distribution.** Korea, Japan.

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