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A New Species of Genus *Anyphaena* from Taiwan (Araneae, Anyphaenidae)

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ABSTRACT

Anyphaena taiwanensis sp. nov. is newly added to the spider fauna of Taiwan, which is distributed in the high mountains beyond 2000 m in altitude. The body size of *A. taiwanensis* is smaller than that of *A. wuyi* Zhang, Zhu et Song, 2005, another species of Taiwan. *Anyphaena taiwanensis* most resembles *A. pugil* Karsch, 1879 but can be distinguished from the latter in female epigynum by having a wider anterior part of the middle furrow and a pair of rounded markings situated at the posterior part of epigynum, and in male by having the palpal femur spines arranged in a row and the bulb with a long and lamellar median apophysis. Both sexes of *A. taiwanensis* are described and illustrated in the present paper.

Key words: Araneae, Anyphaenidae, *Anyphaena taiwanensis*, new species, Taiwan

Introduction

The anyphaenid spiders are two-clawed nocturnal hunters. They can be recognized by having a large median tracheal spiracle in the venter of abdomen and having the claw tufts composed of rows of lamelliform setae (Platnick, 1974; Richman and Ubick, 2005; Roth, 1993; Zhang *et al.*, 2005). More than 500 species of anyphanid spiders have been documented worldwide, and *Anyphaena* Sundevall 1833 is the largest genus of the family (Platnick, 2011; Zhang *et al.*, 2005). In contrast to their abundant species diversity in America, only six species have been recorded from Japan (two species), mainland China (four species), Korea (one species) and Taiwan (one species) (Chen, 2009; Platnick, 2011; Song *et al.*, 1999; Zhang *et al.*, 2005; Zhang et Song, 2004). Up to date, *Anyphaena wuyi* Zhang, Zhu et Song 2005 is the only *Anyphaena* species found in the Taiwan proper and the Lanyu Island with a great ranges of altitudes from the sea shore up to about 2100 m above the sea level (Chen, 2009). However, the spider fauna of Taiwan is remained poorly investigated. Recently, we examined the spider collections from the coniferous forests in the high altitude mountain regions (above 2000 m in altitude) of Taiwan. In addition to *Anyphaena wuyi*, an un-described anyphaenid was revealed that will be described in the present paper.

Materials and Methods

Spiders were collected by sweeping method in daytime or by searching along the foliage at night. Both holotype and paratypes were preserved in 70% ethanol and deposited in the Arachnological collection of the Department of Life Science, National Taiwan Normal University, Taipei City, Taiwan (NTNUB-Ar). Alcohol-preserved specimens were examined and measured under a stereomicroscope (Leica M3Z). The female epigynes were dissected and cleaned in a hot 10% KOH solution to examine the inner genital structures. Specimens were photographed using a Nikon Coolpix 995 camera attached to the stereomicroscope (Leica M3Z). Figures were drawn with the aid of a drawing tube attached to the stereomicroscope. All measurements given are in mm. Measurements of palp are shown as: total

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length (femur, patella, tibia, tarsus). Measurements of leg are shown as: total length (femur, patella and tibia, metatarsus, tarsus). Abbreviations used in this paper are: AER, anterior eye row; ALE, anterior lateral eye; AME, anterior median eye; AW, anterior width of MOA; MOA, median ocular area; MOA-L, length of MOA; PER, posterior eye row; PLE, posterior lateral eye; PME, posterior median eye; PW, posterior width of MOA.

Systematics

***Anyphaena taiwanensis* sp. nov.** (Figs. 1-9)

Type series. **Holotype:** male, NTNUB-Ar 62024, Tienchih, Lenai, Nantou County, 2860 m, 9 Feb. 2011, Tien-Yen Yang leg. **Paratypes:** 1 female, NTNUB-Ar 62219, data same as in holotype; 1 female, NTNUB-Ar 49066, Guanwu, Taian, Miaoli County, 2000 m, 22 Sept. 2010, Shyh-Hwang Chen leg.; 1 female, NTNUB-Ar 45870, Hsiangyang, Haituan, Taitung County, 2700 m, 7 July 2007, Wen-Juen Huang leg.

Diagnosis. *Anyphaena taiwanensis* sp. nov. having a small biconvex scutum in anterior part of the female epigynum and long spines on the femur of male palp most resembles those of *A. pugil* Karsch, 1879 from the Far East Asia, but it can be distinguished from the latter (characters in parentheses) in female epigynum by having a wider anterior part of the middle furrow (narrower) and a pair of rounded markings situated at the posterior part of epigynum (absent), and in male by having the palpal femur spines arranged in a row (in a brief cluster) and the bulb with a long and lamellar median apophysis (flattened median apophysis).

Description. Male (holotype). Total length 3.88: carapace length 1.68, width 1.36, ratio of length/ width 1.24; abdomen length 2.20, width 1.40. Diameters of AME 0.09, ALE 0.13, PME 0.13, PLE 0.13. Measurements of palp and legs: palp 1.84 (0.64, 0.28, 0.36, 0.56); I 5.84 (1.60, 2.12, 1.24, 0.88), II 5.48 (1.56, 1.92, 1.16, 0.84), III 4.44 (1.32, 1.48, 1.00, 0.64), IV 5.64 (1.60, 1.92, 1.40, 0.72). Carapace brown, with two broad longitudinal dark brown markings on submargins; thoracic groove prominent and elongated. Eyes arranged in two rows, PER procurved, wider than AER, PLE close to ALE. PME = PLE = ALE > AME. MOA length 0.31, anterior width 0.21, posterior width 0.31. Height of clypeus 0.56 times diameter of AME. Chelicerae dark brown, promargin of fang groove armed with 3 robust triangular teeth and retromargin with 4 smaller teeth. Labium brown, length equals width. Sternum brown, cardinal shape, bordered with dark brown margin; posterior end intruding between coxae IV. Abdomen oblong; dorsum pale yellow with a longitudinal dark brown cardiac mark followed by five pairs of short chevron markings, and bordered with a dark brown band on both sides; venter with a transverse tracheal spiracle located about half way from epigastric furrow to anterior spinnerets. Legs pale brown with tibiae, metatarsi and tarsi of all legs deep brown. All coxae smooth, without a ventral knob. Leg formula 1-4-2-3. Palpal femur bears with a row of strong spines proximally; retrolateral tibial apophysis shoe-shaped with an upward smaller spatulate branch at base. Median apophysis lamelliform, conductor small, fang-shaped and curved ventrally.

Female (paratype, NTNU-Ar 49066). Similar to male in body shape. Total length 4.48: carapace length 2.00, width 1.64, ratio of length/width 1.22; abdomen length 2.48, width 1.56. Diameters of AME 0.10, ALE 0.13, PME 0.13, PLE 0.13. Measurements of palp and legs: palp 2.04 (0.72, 0.28, 0.36, 0.68); I 6.20 (1.80, 2.28, 1.32, 0.80), II 5.96 (1.72, 2.16, 1.28, 0.80), III 4.92 (1.48, 1.72, 1.08, 0.64), IV 6.32 (1.84, 2.20, 1.56, 0.72). Eyes arrange in two rows, PER procurved, wider than AER, PLE close to ALE. PME = PLE = ALE > AME. MOA length 0.36, anterior width 0.23, posterior width 0.39. Height of clypeus 0.80 times diameter of AME. Chelicerae brown, promargin of fang groove armed with 3 robust triangular teeth and retromargin with 4 smaller teeth. Abdomen oblong, dorsum grayish brown, covered with dark brown and reddish hairs, pale brown ventrally, a transverse tracheal spiracle located about middle from epigastric furrow to anterior spinnerets. Legs pale brown with tibiae, metatarsi and tarsi of all legs dark brown; coxae smooth, without a ventral knob. Leg formula 4-1-2-3. Epigynum bears with a longitudinal middle furrow gradually widened and widest in anterior part, a small biconvex dark brown scutum in front of furrow, and a pair of round markings situated at base of epigynum and close to epigastric furrow.

Variations. Variations among three females

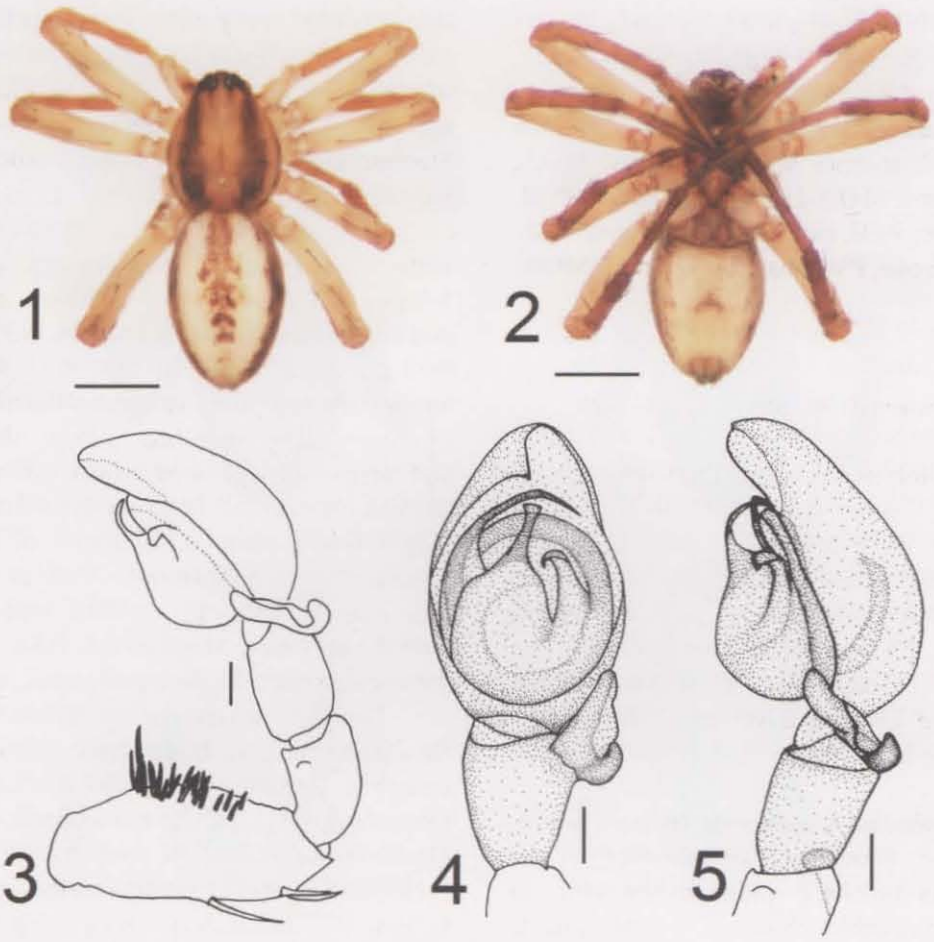

Figure 1-5. *Anyphaena taiwanensis* sp. nov., male (holotype, NTNUB-Ar 62024). 1. dorsal side of body, left leg III missing; 2. ventral side of body; 3. left male palp, prolateral view; 4. left male palp, ventral view; 5. left male palp, prolateral view. Scales: 1 mm (1, 2); 0.1 mm (3-5).

(paratypes) were measured (with the mean in parentheses). Total length 4.48-5.40 (4.89): carapace length 1.96-2.16 (2.04), width 1.62-1.80 (1.69), ratio of length/ width 1.20-1.22 (1.21); abdomen length 2.48-3.24 (2.85), width 1.56-1.92 (1.79). Height of clypeus 0.08 (0.08). Diameters of AME 0.10-0.12 (0.11), ALE 0.13-0.15 (0.14), PME 0.13 (0.13), PLE 0.13-0.15 (0.14); ratio of MOA-L/ AW 1.42-1.57 (1.48), ratio of MOA-AW/ PW 0.59-0.70 (0.66).

Etymology. The specific name is a noun in apposition, and refers to the main island of Taiwan where the new species was found.

Distribution. Taiwan.

Discussion

Because of its nocturnal habit and uncommon, anyphaenid spiders become the most recently discovered family in Taiwan. In addition to *Anyphaena wuyi, A. taiwanensis* sp. nov. is the second species of anyphaenids found in Taiwan. Unlike the vast ranges of altitude in *Anyphaena wuyi* from the sea shore up to 2700 m of the high mountains, *A. taiwanensis* is distributed in the high mountains beyond 2000 m in altitude (ca. 2000-3000 m above the sea level). Both species were found in the Guanwu and Hsiangyang areas sympatrically (Chen, unpublished data). *Anyphaena taiwanensis* is most closely allied to *A. pugil* from Japan, Korea and Russia (see diagnosis). *Anyphaena pugil* in Japan was recorded to dwell in the foliage of coniferous trees but can be found hiding in the crevices of tree barks during winter (Chikuni, 1989). In Taiwan, the dominant tree of

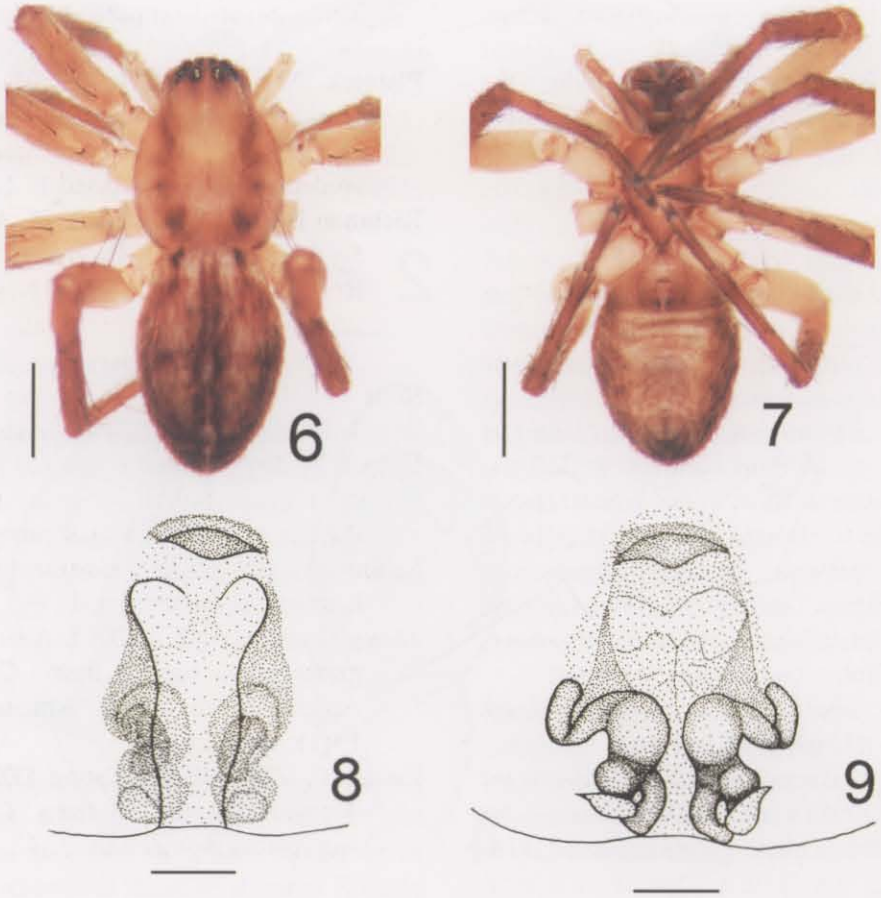

Figure 6-9. *Anyphaena taiwanensis* sp. nov., female (NTNU-Ar 49066). 6. dorsal side of body, right legs I and III missing; 7. ventral side of body; 8. epigynum, ventral view; 9. vulva, dorsal view. Scales: 1 mm (6, 7); 0.1 mm (8, 9).

coniferous forests is *Tsuga chinensis* var *formosana* in the Tienchih and Hsiangyang areas but is the cultivated *Cryptomeria japonica* in the Guanwu area. *Anyphaena taiwanensis* were found on the foliage of low vegetation under the coniferous forests, which implies both *A. taiwanensis* and *A. pugil* might have the same habitats. Unfortunately, the inference was based on few observations and further broad field investigation is needed before making the conclusion.

The morphology of male *A. taiwanensis*, especially in palpal organ, is quite different from that of *A. pugil* that support the validity of the new species. Although the female epigynum of *A. taiwanensis* is distinguishable from that of *A. pugil* according to illustrations made by Chikuni (1989), Marusik (2009), Namkung (2003) and Ono (2009), females of both species have only a minor difference in the external features and the identification is difficult. Because we do not have any specimen of *A. pugil* on hand, further examining the female vulva of *A. pugil* would make the difference more clear.

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trees in Guan-wu" of Shyh-Hwang Chen and "The monitoring program of recreation behavior and eco-environmental resource in Nengkao cross-mountain trail" of Ying Wang at the National Taiwan Normal University supported by the Forestry Bureau, Council of Agriculture, Executive Yuan.

References

Chen SH. 2009. *Anyphaena wuyi* Zhang, Zhu et Song 2005, a newly recorded spider from Taiwan (Araneae, Anyphaenidae). Bioformosa 44: 69-74.

Chikuni Y. 1989. *Pictorial Encyclopedia of Spiders in Japan.* Kaisei-sha Publ. Co., Tokyo, 310 pp.

Karsch F. 1879. Baustoffe zu einer Spinnenfauna von Japan. *Verh. naturh. Ver. preuss. Rheinl. Westfal.* 36: 57-105.

Marusik YM. 2009. A check-list of spiders (Aranei) from the Lazo Reserve, Maritime Province, Russia. Arthropoda Selecta 18: 95-109.

Namkung J. 2003. *The Spiders of Korea*, 2nd. ed. Kyo-Hak Publ. Co., Seoul, 648 pp.

Ono H. 2009. *The Spiders of Japan with keys to the families and genera and illustrations of the species.* Tokai Univ. Press, Kanagawa, xvi+739 pp.

Platnick NI. 1974. The spider family Anyphaenidae in America north of Mexico. Bulletin of the Museum of Comparative Zoology Harvard, 146: 205-266.

Platnick NI. 2011. The world spider catalog, version 11.5. American Museum of Natural History, online at http://research.amnh.org/iz/spiders/catalog. (accessed 17 February 2011)

Richman DB and Ubick D. 2005. Anyphaenidae. P. 66-67 in Ubick D, Paquin P, Cushing PE and Roth V (eds.) Spiders of North America: an identification manual. American Arachnological Society.

Roth VD. 1993. *Spider Genera of North America*, 3rd ed. American Arachnological Society.

Song DX, Zhu MS and Chen J. 1999. *The Spiders of China.* Hebei Science and Technology Publishing House, Shijiazhuang.

Sundevall JC. 1833. *Conspectus Arachnidum.* Londini Gothorum, pp. 1-39.

Zhang C and Song DX. 2004. A new species of the genus *Anyphaena* from China (Araneae: Anyphaenidae). Acta Arachnologica Sinica, 13(1): 11-13.

Zhang F, Zhu MS and Song DX. 2005. A new *Anyphaena* species from China (Araneae: Anyphaenidae). Zootaxa, 842: 1-7.

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一種臺灣產近管蛛屬蜘蛛之新種(蜘蛛目，近管蛛科)

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摘　要

本文描述台灣近管蛛 (*Anyphaena taiwanensis* sp. nov.)為台灣蜘蛛之新種。台灣近管蛛之體長較武夷近管蛛(*Anyphaena wuyi*)為小，而形態構造上則與本屬之普及近管蛛(*Anyphaena pugil*)最相似，其主要區別為：雌蛛外雌器之中溝前方較寬，並有一對圓斑在外雌器後方；雄蛛觸肢腿節的前側棘排成一列，觸肢器之中突呈長片狀。廣泛分布於台灣 2000~3000 公尺的高山地區。

關鍵詞：蜘蛛目、近管蛛科、台灣近管蛛、新種、台灣

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