

# A New Record and Re-description of *Oxyopes sushilae* (Araneae, Oxyopidae) in Taiwan

## 臺灣產盾形貓蛛之新紀錄與重新描述

Ying-Yuan Lo<sup>1,2,\*</sup> and Chung-Ping Lin<sup>2</sup>

羅英元<sup>1,2,\*</sup> 林仲平<sup>2</sup>

<sup>1</sup>Endemic Species Research Institute, Nantou, Taiwan

<sup>2</sup>Department of Life Science, National Taiwan Normal University, Taipei, Taiwan

<sup>1</sup>行政院農業委員會特有生物研究保育中心 55244 南投縣集集鎮民生東路1號

<sup>2</sup>國立台灣師範大學生命科學系 11677 台北市文山區汀州路四段88號

\* Corresponding author: danny@tesri.gov.tw

\*通訊作者：danny@tesri.gov.tw

### Abstract

*Oxyopes sushilae* Tikader, 1965 is recorded in Taiwan for the first time. Both male and female of the species are re-described and illustrated here based on the specimens collected in Taoyuan, Miaoli, Nantou, Yunlin and Kaoshiung. The species can be recognized by a sclerotized and shield-like shaped epigynum, and the extension of a conspicuous basal-lateral hamulus process on cymbium of palp organ. This species is mainly distributed from low to medium altitudes of western Taiwan.

### 摘要

本文報導盾形貓蛛 (*Oxyopes sushilae* Tikader, 1965) 在臺灣之首次紀錄，並對雌雄個體重新描述和繪圖。本種可由雌蛛外雌器之骨片成盾形、雄蛛觸肢器杯葉基部側面有一鉤狀突起等特徵與它種區別。盾形貓蛛主要分布於臺灣西部中低海拔山區。

**Key words:** Araneae, Oxyopidae, new record, Taiwan

**關鍵詞：**蜘蛛目、貓蛛科、新紀錄、臺灣

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## Introduction

The lynx spiders of the family Oxyopidae are small to medium size spiders. They are diurnal, wandering hunters searching for prey in the shrub, lawn, tree crown, and farmland. The lynx spiders can be recognized by the high clypeus, hexagonal arranged eyes, tapered abdomen and thin legs with long, stiff and conspicuous spines (Ono and Ban, 2009; Zhu and Zhang, 2011). The anterior median eyes are small, and the remaining six eyes are spread out in a hexagonal shape on the top of the head.

The family of Oxyopidae consists of nine genera and 452 described species worldwide (World Spider Catalog, 2015). Up to present, only two genera and three species (*Peucetia formosensis* Kishida, 1930, *Oxyopes macilentus* L. Koch, 1878 and *O. sertatus* L. Koch, 1878) were recorded in Taiwan (Chu and Okuma, 1975). Recently, we collected and examined specimens of lynx spider from Taiwan, and found a species newly recorded to the Taiwanese spider fauna. The morphology of these specimens agrees with that of *Oxyopes sushilae*,

in which the male was described by Tikader (1965) from India and the female was described by Hu *et al.* (1985) from China. In this article, both sexes of *O. sushilae* were re-described based on new materials from Taiwan.

## Materials and Methods

Spiders were collected by a sweeping net or through visual search of their habitats. The obtained specimens were examined, measured and photographed under a stereomicroscope (Leica, MZ125). The epigynum of females was dissected and cleaned in a warm 10% KOH solution for examining its inner genital structure. All measurements are given in millimeters (mm). The measurements of the palp were shown as: total length (femur, patella, tibia, tarsus). The measurements of legs were shown as: total length (femur, patella and tibia, metatarsus, tarsus). Abbreviations used in this paper were: AER, anterior eye row; ALE, anterior lateral eye; AME, anterior median eye; MOA, median ocular area; PER, posterior eye row; PLE, posterior lateral eye; PME, posterior median eye.

## Results

### *Oxyopes sushilae* Tikader, 1965

*Oxyopes sushilae* Tikader, 1965: 141-143, fig. 2; Hu *et al.*, 1985: 28-31, figs. 1-8; Song, 1991: 175-177, fig. 7; Zhu and Zhang, 2011: 337, fig. 244; Yin *et al.*, 2012: 920, fig. 466.

### Specimens examined.

**TAOYUAN City:** DAXI, Datelaio, one male and two females (TESRI-Ar 0518–0520), 17 Apr. 2013, Ying-Yuan Lo leg.; FUXING, Sanmin, one male (TESRI-Ar 0523), 18 Apr. 2013, Ying-Yuan Lo leg. **MIAOLI County:** NANZHUANG, Shitoushan, two males (TESRI-Ar 1000, 0526), 24 Apr. 2013, Ying-Yuan Lo leg. **NANTOU County:** PULI, Taomikeng, two males and two females (TESRI-Ar 0907–0910), 10 Oct. 2014, Ying-Yuan Lo leg. **YUNLIN County:** GUKENG, Qipan village, two females (TESRI-Ar 0768–0769), 22 Apr. 2014, and two females (TESRI-Ar 0982, 1016), 2 Sep. 2014, Ying-Yuan Lo leg. **KAOSIUNG City:** TAOYUAN, Shishan forest road, one female (TESRI-Ar 0887), 18 June 2014, Ying-Yuan Lo leg.

### Diagnosis.

*Oxyopes sushilae* is similar to *O. macilentus* L. Koch, 1978 in body shape, coloration and shape of palp. *Oxyopes sushilae* can be distinguished from the latter by a sclerotized shield-like epigynum, in contrast to the two arc-like structures in *O. macilentus*. The male palpal cymbium bears a conspicuous dorsal

hamulus process (less developed in *O. macilentus*), and there is a longitudinal ridge within the depression of palp retrolateral tibia (an oblique ridge at the infra-margin of the depression in *O. macilentus*).

### Description (all measurements given in mm).

Female (TESRI-Ar 0909). Total length 8.9; cephalothorax length 3.4, width 2.7; abdomen length 5.5, width 1.7. Measurements of palp and legs: palp 3.0 (0.9, 0.3, 0.6, 1.2); leg I 17.5 (4.7, 6.0, 5.0, 1.8), leg II 16.0 (4.5, 5.4, 4.7, 1.4), leg III 12.9 (3.9, 4.1, 3.7, 1.2), leg IV 16.4 (4.8, 5.2, 5.0, 1.4). Carapace greenish-orange, pear-shaped, with two broad longitudinal dark markings on submargin, and two thin longitudinal orange markings from PME to margin of carapace; thoracic groove prominent. Eyes arranged in four rows, AER strongly recurved and PER strongly procurved. Diameters of AME 0.12, ALE 0.20, PME 0.20, PLE 0.20. MOA length 0.90, anterior width of MOA 0.38, posterior width of MOA 0.68; interval of AMEs 0.14, interval of PMEs 0.28. Clypeus 0.58, 4.8 times diameter of AME. Clypeus high, with two black streaks extending from anterior margin of AME toward anterior margin of dorsal surface of chelicera. Chelicera, sternum, endite, labium, and legs greenish-orange. Legs clothed with conspicuous long spines, longitudinal black stripes on ventral femur of all legs. Abdomen long, narrow, covered with scales; dorsum with a longitudinal deep brown central band, each side of the band with numerous deep brown stripes, bordered with two thin black lines on both sides

(Fig.1). Venter with three broad black bands, blending into one broad band and extending from epigastric fold to base spinnerets.

Epigynum yellowish, sclerotized and shield-like shape with deep lateral semicircle notch on both sides. Spermatheca large, fertilization ducts long, anterior ducts curved into semi-circular shape, elongate posteriorly beside spermatheca (Figs. 2-3, 5-6).

Male (TESRI-Ar0907). Total length 7.8: cephalothorax length 3.2, width 2.7; abdomen length 4.6, width 1.5. Measurements of palp and legs: palp 4.6 (1.3, 0.5, 0.7, 2.1); leg I 17.6 (4.2, 5.8, 5.2, 2.4), leg II 15.2 (3.8, 5.0, 4.6, 1.8), leg III 12.6 (3.5, 4.3, 3.4, 1.4), leg IV 15.3 (4.2, 4.9, 4.6, 1.6). Diameters of AME 0.10, ALE 0.20, PME 0.20, PLE 0.20. MOA length 0.84, anterior width of MOA 0.34, posterior width of MOA 0.56; interval of AME 0.14, interval of PME 0.16. clypeus 0.52, 5.2 times diameter of AME. Total length slightly smaller than female, body shape and coloration are similar to female.

Palp retrolateral tibia swallow and sunken with a vertical ridge and a small flake process. Dorsal base of cymbium extends a prominent hamulus-like process (Fig. 4, 7).

#### Variations.

Four females and five males were measured to quantify the morphological variation. Values are mean  $\pm$  SD of females (with the male in parentheses). Total length 8.8 $\pm$ 0.5 (8.1 $\pm$ 0.4); cephalothorax length 3.5 $\pm$ 0.2 (3.3 $\pm$ 0.1), width 2.6 $\pm$ 0.1 (2.7 $\pm$ 0.1); abdomen length 5.3 $\pm$ 0.4 (4.8 $\pm$ 0.3), width 1.7 $\pm$ 0.1 (1.6 $\pm$ 0.2). Height of

clypeus 0.58 $\pm$ 0.05 (0.49 $\pm$ 0.10). Diameters of AME 0.1 $\pm$ 0.02 (0.10 $\pm$ 0.00), ALE 0.22 $\pm$ 0.02 (0.20 $\pm$ 0.00), PME 0.20 $\pm$ 0.01 (0.19 $\pm$ 0.02), PLE 0.20 $\pm$ 0.00 (0.20 $\pm$ 0.01). Leg I 17.1 $\pm$ 1.7 (17.3 $\pm$ 1.9); Leg II 15.1 $\pm$ 1.3 (15.4 $\pm$ 1.5); Leg III 12.4 $\pm$ 1.1 (13.0 $\pm$ 1.5); Leg IV 15.4 $\pm$ 1.5 (15.7 $\pm$ 1.7)

#### Distribution.

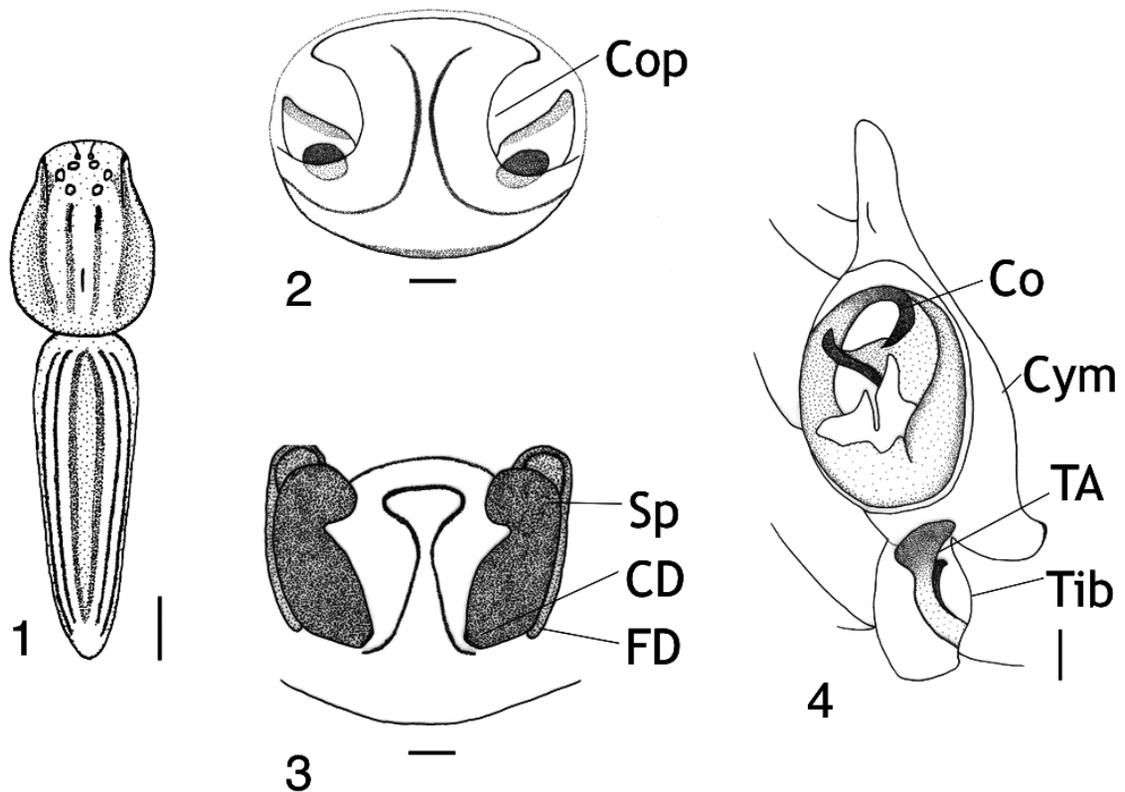
India (Maharashtra), China (Henan, Hunan, Guangdong, Zhejiang, Jiangxi, Anhui, Hainan, Fujian, Guizhou), and Taiwan.

#### Discussion.

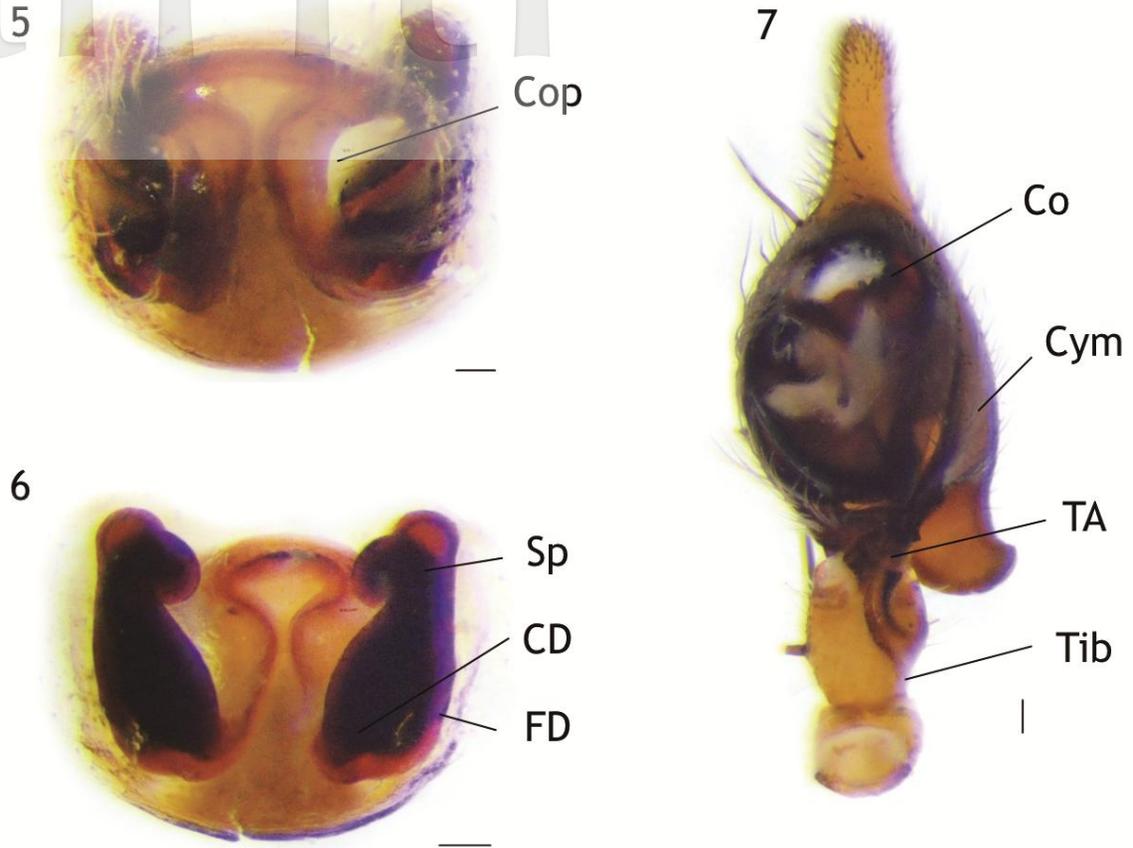
The female of *O. sushilae* was first described by Tikader (1965), and the male was later reported by Hu *et al.* (1985). Although the original drawings were not in details and we were unable to examine the type specimen, both female epigynum and male palpal organ of Taiwanese specimens examined here fit the description of *O. sushilae* in Hu *et al.* (1985). The type specimen of *O. sushilae* was collected from Maharashtra of India (Tikader, 1965). Subsequently, Hu *et al.* (1985), Song (1991), Wang (2009), Zhu & Zhang (2011) and Yin *et al.* (2012) inspected additional populations collected from Henan, Hunan, Guangdong, Zhejiang, Jiangxi, Anhui, Hainan Fujian and Guizhou in China, respectively. Thus it appears that *O. sushilae* is wide spread in southern Asia. Based on the records in this study, *O. sushilae* is mainly distributed from low to medium altitudinal mountains of western Taiwan (Fig. 8). *Oxyopes sushilae* was observed to occur at the same

habitats of *O. macilentus*, which had been recorded by Chu and Okuma (1970) at Wufeng (Taichung), Meichi and Chunyang (Nantou) in the paddy field of Taiwan. Because of the similarity in body shape, coloration and shape of palpal organ of the two species, the earlier record of *O. macilentus* in Taiwan is likely to be

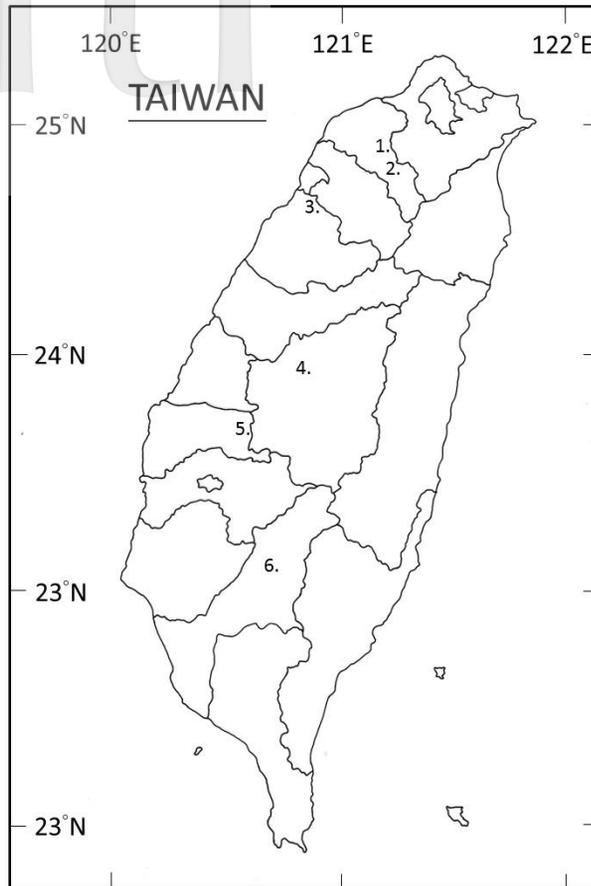
inaccurate if genital organs did not been examined cautiously. The results suggest that the taxonomic and distributional study of lynx spiders in Taiwan are limited, thus the effort is required for extensive field collections of lynx spiders and careful examination of their genital organs.



**Figure 1-4.** *Oxyopes sushilae*. 1, dorsal view of female cephalothorax and abdomen; 2, female epigynum, ventral view; 3, female vulva, dorsal view; 4, left male palpal organ, ventral view. 1-3, female, TESRI-Ar 0909; 4, male, TESRI-Ar 0907. CD: copulatory duct; Cop: copulatory opening; Co: conductor; Cym: cymbium; FD: fertilization duct; Sp: spermathecal; TA: tibia apophysis; Tib: tibia. Scale bars: Fig. 1 = 1 mm; Figs. 2-4 = 0.1 mm.



**Figure 5-7.** *Oxyopes sushilae*. 5, female epigynum, ventral view; 6, female vulva, dorsal view; 7, left male palpal organ, ventral view. 5-6, female, TESRI-Ar 0909; 7, male, TESRI-Ar 0907. CD: copulatory duct; Cop: copulatory opening; Co: conductor; Cym: cymbium; FD: fertilization duct; Sp: spermathecal; TA: tibia apophysis; Tib: tibia. Scale bars : 0.1 mm.



**Figure 8.** Sample collection of *Oxyopes sushilae* in Taiwan included in this study. The numbers indicate collecting localities (1: Datelaio, Taoyuan City; 2: Sanmin, Taoyuan City; 3: Shitoushan, Miaoli County; 4: Taomikeng, Nantou County; 5: Qipan village, Yunlin County; 6: Shishan forest road, Kaohsiung City).

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## References

- Chu, Y. I. and C. Okuma. 1970. Preliminary survey on the spider-fauna of the paddy fields in Taiwan. *Mushi* 44: 65-88.
- Chu, Y. L. and C. OKuma, 1975, A check list of spiders in Taiwan(II). *Journal of Taiwan Museum* 18:101-19.

Hu, Y. J., M. X. Liu and F. J. Li. 1985. A description of the *Oxyopes sushilae* Tikader, 1965 (Araneae, Oxyopidae). Journal of Hunan Normal University (nat. Sci.) 1985 (1): 28-31.

Kishida, K. 1930. A new Formosan oxyopid spider, *Peucetia formosensis* n. sp. Lansania 2: 145-150.

Koch, L. 1878. Die Arachniden Australiens. Nürnberg 1, 969-1044.

Ono, H. and M. Ban. 2009. Oxyopidae, Philodromidae. In: Ono, H. (ed.) The Spiders of Japan with keys to the families and genera and illustrations of the species. Tokai University Press, Kanagawa, pp. 249-250, 476-481.

Song, D. X. 1991. On lynx spiders of the genus *Oxyopes* (Araneae: Oxyopidae) from China. Sinozoologia 8: 169-181.

Tikader, B. K. 1965. On some new species of spiders of the family Oxyopidae from India. Proceedings of the Indian Academy of Science 62 (3): 140-144.

Yin, C. M., X. J. Peng, H. M. Yan, Y. H. Bao, X. Xu, G. Tang, Q. S. Zhou and P. Liu. 2012. Fauna Hunan: Araneae in Hunan, China. Hunan Science and Technology Press, Changsha, 1590 pp.

Zhu, M. S. and B. S. Zhang. 2011. Spider Fauna of Henan: Arachnida: Araneae. Science Press, Beijing, xxii+558 pp.

Wang, Q. B. 2009. Taxonomy of the spider family Oxyopidae from China (Arachnida: Araneae). Master thesis, Hunan University,

Hunan, China.

World Spider Catalog (2015). World Spider Catalog. Natural History Museum Bern, online at <http://wsc.nmbe.ch>, version 16.5, accessed on {date of access}