

The Spider Family Theridiidae (Arachnida: Araneae) from Orchid Island, Taiwan: Descriptions of Six New and One Newly Recorded Species

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Hajime Yoshida, I-Min Tso and Lucia Liu Severinghaus (2000) The spider family Theridiidae (Arachnida: Araneae) from Orchid Island, Taiwan: descriptions of six new and one newly recorded species. *Zoological Studies* 39(2): 123-132. From a preliminary spider fauna investigation conducted in 1993 and 1997 on Orchid Island, Taiwan, 17 species of the spider family Theridiidae are recorded. Six of them are described as new species under the names, *Argyrodes nigroris*, *Chrosiothes fulvus*, *Chrosiothes taiwan*, *Chrysso orchis*, *Achaeearanea lanyuensis*, and *Achaeearanea quadrimaculata*. *Theridion xianfengensis* Zhu and Song, 1992 is recorded for the first time from Taiwan. This paper describes the external morphology of these 7 new/new record species and reports the synonymies and distribution records of the other 10 theridiid species.

Key words: Spider fauna, New species, Orchid Island, Theridiidae.

Currently, spider diversity in most areas of Taiwan is severely understudied. Islands off both the east and west coasts of Taiwan have received even less attention. One such island is Orchid Island (Lanyu in Chinese; 22°N, 121°E, area 45 km²), a tropical island in a chain of islands stretching from the Philippines, Taiwan, and the Ryukyus to Japan. Located 91 km off the southeastern coast of Taiwan, Orchid Island's climate is characterized by relatively high temperatures (average 22.4 °C), high humidity (more than 90%), and high annual rainfall (more than 2600 mm) (Chen 1982). Due to its tropical climatic pattern, Orchid Island is covered by dense primary forest which is relatively unexplored compared with forests in Taiwan. Previous expeditions focusing on the diversity of selected groups (mainly vertebrates and flowering plants) have revealed that Orchid Island's fauna and flora both contain components that are unseen in Taiwan but are common in the Philippines (Shen 1998). Therefore, Orchid Island should have a unique spider diversity that differs from known Taiwanese fauna.

In 1993 and 1997, we conducted several field

trips to Orchid Island to study the behavioral ecology of spiders. During those trips, we also made some preliminary collections to assess the feasibility of future comprehensive spider diversity studies. Despite the limited effort expended, we have obtained a large number of specimens from various families that were previously undescribed. Here, we report the results of a preliminary taxonomic study we performed on Orchid Island's theridiid diversity.

Among the approximately 35 000 species of spiders documented worldwide (Foelix 1996), comb-footed spiders of the family Theridiidae are one of the most diverse families, and currently 2350 species have been reported (Zhu 1998). A recent comprehensive review of theridiid morphology, ecology, systematics, and biogeography is available in Zhu (1998). In Taiwan, among all the spider families documented, Theridiidae is the second most diverse, and to date, 45 species have been reported (Chen 1996, Yoshida 1996, Yoshida et al. 1998). Here, we report on 17 species of theridiids collected from Orchid Island. Among them, 4 species of *Argyrodes* were previously reported (Yoshida et al.

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1998); 6 species are recognized as new, one is considered a possibly new species, one is recorded from Taiwan for the first time, and the other five are also found in Taiwan. This result increases the number of Taiwanese theridiid species to 52.

METHODS

Specimens recorded in this paper were collected by Y. J. Fang and the authors from 4 major sites on Orchid Island (Taitung County), Taiwan in August 1993 and February to June and October to December 1997 (10 field trips). The 4 major collection sites were Light House (22°05'N, 121°29'E), Yungshing Farm (22°01'N, 121°34'E), Chungai Bridge (22°00'N, 121°33'E), and Tienchih (22°01'N, 121°33'E). Collections were conducted both during the day and at night by hand and sweep net. Two specimens of a new species used in this paper were collected by M. Yoshimura from Chihpen (22°41'N, 121°00'E, Taitung County) and Kenting (22°02'N, 120°47'E, Pingtung County), on the main island of Taiwan.

The holotypes and some paratypes of the new species are deposited in the collection of the Department of Biology, Tunghai University, Taiwan (THU-Ar-) and the National Science Museum (Natural History), Tokyo (NSMT).

All measurements are given in millimeters (mm), except for ratios and leg formulae. The abbreviations used in this paper are as follows: ALE, anterior lateral eye(s); AME, anterior median eye(s); MOA, median ocular area; PLE, posterior lateral eye (s); and PME, posterior median eye(s). The measurements described in this study are based on the holotype and 1 specimen of sex different from that of the holotype. Variations in length of body, carapace, and abdomen are given when additional specimens are available for measurements.

Species Accounts

Dipoena sp.

(Figs. 1-3)

Female: Total length 1.47. Carapace length 0.79; width 0.66. Abdomen length 0.97; width 0.87. First leg: femur 0.66; patella and tibia 0.68; metatarsus 0.39; tarsus 0.47, 2nd patella and tibia 0.61; 3rd patella and tibia 0.47; 4th patella and tibia 0.74.

Diameters of AME: ALE: PME: PLE in the ratio of 7:5:7:6. AME 5/7 their diameter apart and 2/7 from ALE. PME 4/7 their diameter apart and 6/7 from PLE. ALE and PLE almost abutting each other.

MOA, anterior width: posterior width: length in the ratio of 17:15:17. Leg formula: 4, 1, 2, 3. Genital organs as shown in figures 2-3: seminal receptacles 2 pairs; ducts thick, connecting to top of large seminal receptacles.

Coloration: Carapace dusky brown, lighter in head region. Chelicerae, maxillae, and labium grayish dusky brown. Sternum dusky brown. Legs yellowish brown; femora, patellae, tibiae, and metatarsi with distal dusky bands; 1st and 2nd tibiae and metatarsi with ventral dusky flecks. Abdomen black with grayish flecks as shown in figure 1; venter grayish dusky brown; epigynum brown.

Specimen examined: 1 ♀, near Light House, Orchid Island, Taitung County, Taiwan, 18-II-1997, Y. J. Fang leg. (THU-Ar-970001).

Remarks: This species seems to be new. We will assign a new scientific name when more specimens are available.

Dipoena mustelina (Simon, 1888)

(Fig. 4)

Euryopis mustelina Simon, 1888, p. 251; Yaginuma 1960, p. 34, pl. 7, fig. 42.

Dipoena mustelina: Yaginuma, 1967, p. 88; Yaginuma 1986, p. 42, pl. 10, fig. 3, text-fig. 23-3; Zhu 1992, p. 109, figs. 5-6; Zhu 1998, p. 240, fig. 157.

Female: Total length 2.74. Carapace length 1.05; width 1. Abdomen length 1.84; width 1.76. First leg: femur 1.05; patella and tibia 1.21; metatarsus 0.87; tarsus 0.45. Second patella and tibia 1.05; 3rd patella and tibia 1; 4th patella and tibia 1.5.

Coloration: Basal color yellowish white. Carapace with a median dusky fleck. Abdomen with dusky flecks as shown in figure 4; venter with a small dusky fleck between epigynum and spinnerets.

Specimens examined: 1 ♀, Yungshing Farm, Orchid Island, Taitung County, Taiwan, 14-IV-1997, I.M. Tso leg. (THU-Ar-970002); 1 ♂, Tienchih, Orchid Island, Taitung County, Taiwan, 20-XII-1997, I.M. Tso leg. (THU-Ar-970003).

Distribution: Taiwan, China, Japan, Korea, and Indonesia.

Steatoda cingulata (Thorell, 1890)

Stethopoma cingulata Thorell, 1890, p. 289.

Steatoda albilunata: Yaginuma, 1960, p. 34, pl. 7, fig. 41.

Steatoda cavernicola: Yaginuma, 1986, p. 39, pl. 9, fig. 5, text-fig. 21-5.

Steatoda cingulata: Zhu, 1998, p. 329, fig. 220.

Lithyphantes cavaleriei Schenkel, 1963, p. 102, fig. 60.

Lithyphantes cavernicola Bösenberg and Strand, 1906, p. 154, pl. 5, fig. 57; Lee 1964, p. 26, pl. 5, fig. N.

Asagena albilunata Saito, 1939, p. 51, pl. 1, fig. 3, text-fig. 6-3.

Specimen examined: 1 ♂, Light House, Orchid Island, Taitung County, Taiwan, 18-III-1997, I.M. Tso leg. (THU-Ar-970022).

Distribution: Taiwan and Orchid Island. Widely distributed in Japan, China, and Southeast Asia.

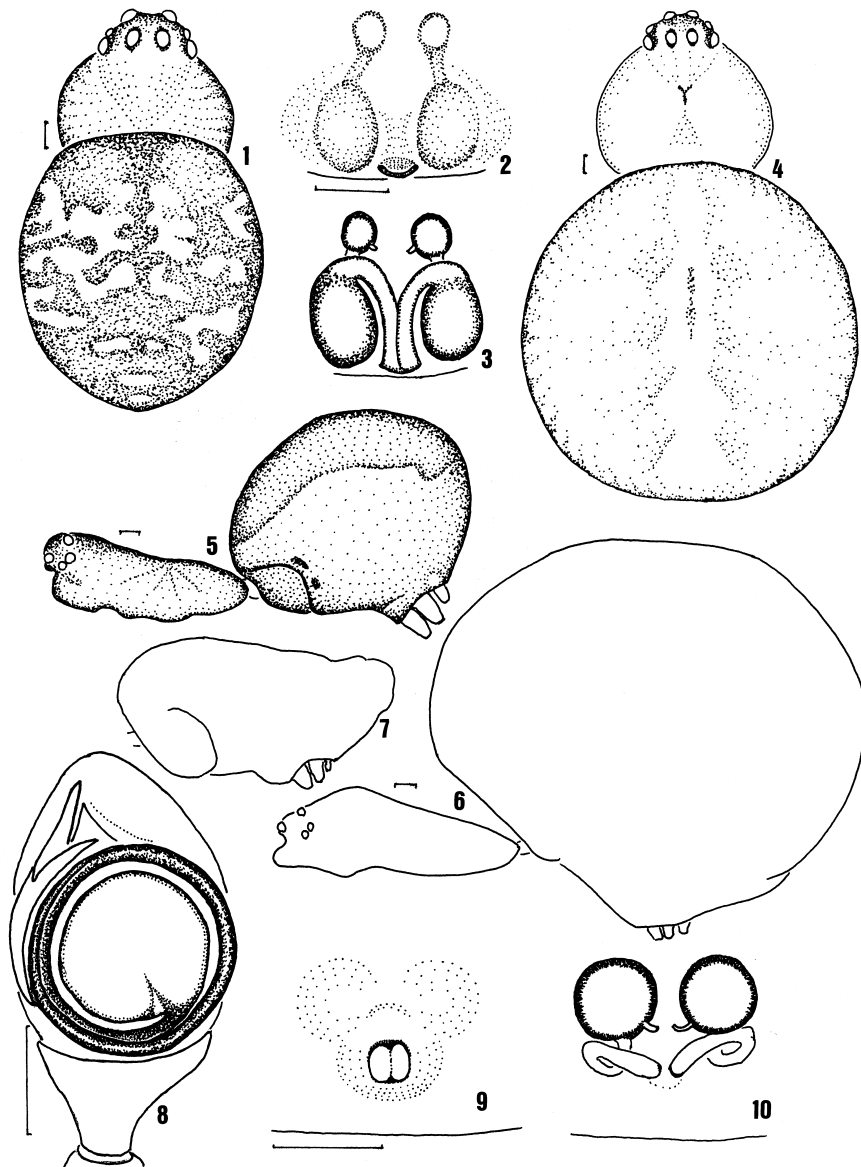
***Argyrodes nigroris* sp. nov.**

(Figs. 5-10)

Male: Total length 1.95. Carapace length 0.79; width 0.55. Abdomen length 1.16; width 0.89; height

0.82. First leg: femur 1.11; patella and tibia 1.11; metatarsus 0.79; tarsus 0.5. Second patella and tibia 0.74; 3rd patella and tibia 0.45; 4th patella and tibia 0.63.

Carapace elongated and flattened; eye region projecting; clypeus with small concavity. Diameters of AME: ALE: PME: PLE in the ratio of 4:3:2:2. AME 5/4 their diameter apart and 1/4 from ALE. PME twice their diameter apart and 3/4 from PLE. MOA, anterior width: posterior width: length in the ratio of 5:4:4. Abdomen suboval; dorsum, epigastric area,



Figs. 1-10. 1-3. *Dipoena* sp. 1, female carapace and abdomen, dorsal view; 2, epigynum, ventral view; 3, female genitalia, dorsal view. 4. *Dipoena mustelina* (Simon, 1888), female carapace and abdomen, dorsal view. 5-10. *Argyrodes nigroris* sp. nov. 5, male carapace and abdomen, lateral view; 6, female carapace and abdomen, lateral view (before oviposition); 7, female abdomen, lateral view (after oviposition); 8, male palpus, ventral view; 9, epigynum, ventral view; 10, female genitalia, dorsal view. (Scales: 0.1 mm)

and area around spinnerets sclerotized. Palpal organ as shown in figure 8; embolus thin and long, having 1.5 loops.

Coloration: Basal color black. Distal part of 1st and 2nd femora, and 3rd and 4th femora yellowish brown. Third and 4th patellae and tibiae brown. Metatarsi and tarsi brown. Abdomen with a pair of small grayish flecks beside spinnerets; sclerotized area lustrous.

Female: Total length 2.21 to 4.37. Carapace length 1.05 to 1.21; width 0.74. Abdomen length 1.26 to 4.05; width 2.12; height 2.12. First leg: femur 0.92; patella and tibia 1; metatarsus 0.66; tarsus 0.45. Second patella and tibia 0.76; 3rd patella and tibia 0.53; 4th patella and tibia 0.79.

Clypeal projection small. AME larger than the others (by the ratio of 7:4). AME 9/7 their diameter apart and 1/7 from ALE. PME twice their diameter apart and 1 diameter from PLE. MOA, anterior width: posterior width: length in the ratio of 11:9:8. Legs lighter than those of male; 4th legs yellowish brown. Abdomen blackish brown. Abdomen large in specimens prior to oviposition (Fig. 6), small and depressed in those having completed oviposition (Fig. 7). Genital organ as shown in figures 9-10: an opening of the epigynum divided into 2 parts; seminal receptacles large; ducts coiled once.

Other characters the same as those of the male.

Type specimens: Holotype: ♂, Orchid Island, Taitung County, Taiwan, 14-VIII-1993, H. Yoshida leg. (NSMT). Paratypes: 2 ♀, Chungai Bridge, Orchid Island, 18-III-1997, I.M. Tso leg. (THU-Ar-970004); 1 ♀, Chungai Bridge, 12-III-1997, I.M. Tso leg. (NSMT).

Distribution: Taiwan: Orchid Island.

Remarks: This species resembles *Argyrodes melanosoma* (Yaginuma, 1957) (cf. Tanikawa 1998) from Japan (Honshu to Ryukyu), but is distinguished from the latter by the embolus of the male palpus having 1.5 loops and the female genitalia with relatively simple ducts. However, in *A. melanosoma*, the embolus of the male palpus has more than 2 loops, and the ducts of the female genitalia are very complex and have many loops.

Etymology: The specific name refers to the black color.

***Argyrodes lanyuensis* Yoshida, Tso and Severinghaus, 1998**

Argyrodes lanyuensis Yoshida, Tso and Severinghaus, 1998, p. 2, figs. 1-9.

Specimens examined: 1 ♀, Yunghsing Farm, Orchid Island, Taitung County, Taiwan, 17-II-1997,

I.M. Tso leg. (THU-Ar-970041); 1 ♀, same locality, 14-IV-1997, I.M. Tso leg. (THU-Ar-970042).

Distribution: Taiwan: Orchid Island.

***Argyrodes fissifrons* O. Pickard-Cambridge, 1869**

Argyrodes fissifrons O. Pickard-Cambridge, 1869, p. 380, pl. 12, figs. 31-38; Yaginuma 1960, p. 32, pl. 6, fig. 30; Yaginuma 1986 p. 51, pl. 12, fig. 2, text-fig. 28-2; Zhu 1998, p. 206, fig. 134; Yoshida, Tso and Severinghaus 1998, p. 1.

Specimens examined: 4 ♂♂, 1 ♀, Orchid Island, 15-VIII-1993, H. Yoshida leg.

Distribution: Taiwan. Widely distributed in Southeast Asia.

***Argyrodes flavescens* O. Pickard-Cambridge, 1880**

Argyrodes flavescens O. Pickard-Cambridge, 1880, p. 321, pl. 28, fig. 1; Tanikawa, Chida, and Kumada 1996, p. 48, figs. 1, 3, 5, 7, 9; Zhu 1998, p. 204, fig. 132; Yoshida, Tso, and Severinghaus 1998, p. 1.

Specimens examined: 1 ♀, Orchid Island, 15-VIII-1993, Yoshida leg.; 2 ♀♀, Chungai Bridge, 18-VI-1997, I.M. Tso leg. (THU-Ar-970005-970006).

Distribution: Taiwan. Widely distributed in Southeast Asia.

***Argyrodes cylindrogaster* (Simon, 1888)**

Ariamnes cylindrogaster Simon, 1888, p. 251; Yaginuma 1960, p. 32, pl. 6, fig. 35.

Argyrodes cylindrogaster: Yaginuma, 1986, p. 51, pl. 12, fig. 7, text-fig. 28-7; Zhu 1998, p. 198, fig. 128; Yoshida, Tso, and Severinghaus 1998, p. 1.

Specimens examined: 1 ♀, Chungai Bridge, Orchid Island, 15-II-1997, 2 ♂♂, 16-II-1997, 1 ♀, 18-II-1997, I.M. Tso leg. (THU-Ar-970007-970009); 1 ♂, 1 ♀, Orchid Island, 15-VIII-1993, H. Yoshida leg.

Distribution: Taiwan, China, Japan, and Korea.

***Chrosiothes fulvus* sp. nov.**
(Figs. 11-15)

Male: Total length 1.76 to 2.05. Carapace length 0.74 to 0.87; width 0.79. Abdomen length 1.07 to 1.26; width 0.92. First leg: femur 1.24; patella and tibia 1.16; metatarsus 0.92; tarsus 0.55. Second patella and tibia 1.05; 3rd patella and tibia 0.74; 4th patella and tibia 0.92.

Carapace oval. AME larger than the others (by the ratio of 4:3). AME 3/4 their diameter apart and 1/4 from ALE. PME their diameter apart and from PLE. ALE and PLE almost touching each other. MOA, anterior width: posterior width: length in the

ratio of 10:9:8. Leg formula: 1, 2, 4, 3. Abdomen globular with 4 distinct dorsal and many ventral sclerotized spots, and with many small sclerotized spots bearing short hairs. Epigastric area and around spinnerets sclerotized. Palpal organ as shown in figures 12-13: embolus long, the tip twisted.

Coloration: Basal color light brown. Eye region with dusky flecks. Abdomen light brown; sclerotized part brown.

Female: Total length 2.34 to 2.42. Carapace length 0.87 to 1; width 0.92. Abdomen length 1.61 to 1.92; width 1.11. First leg: femur 1.05; patella and tibia 1.11; metatarsus 0.84; tarsus 0.55. Second patella and tibia 0.87; 3rd patella and tibia 0.82; 4th patella and tibia 0.95.

Eyes almost equal in size. AME their diameter apart and 1/3 from ALE. PME their diameter apart and from PLE. MOA, anterior width: posterior width: length in the ratio of 9:9:7. Sclerotized spots small. Genital organ as shown in figures 14-15: epigynum with a large opening; ducts forming a spiral near the epigynal opening.

Other characters the same as those of the male.

Type series: Holotype: ♂, near Light House, Orchid Island, Taitung County, Taiwan, 16-II-1997, I.M. Tso leg. (THU-Ar-970010). Paratypes: 1 ♀, same data as for holotype (THU-Ar-970010); 1 ♀, same locality and collector as for holotype, 17-II-1997 (THU-Ar-970011); 3 ♀ ♀, 1 ♂, Light House, Orchid Island, I.M. Tso leg. (NSMT).

Other specimen: 1 ♀ juvenile, Orchid Island, 15-VIII-1993, H. Yoshida leg.

Distribution: Taiwan: Orchid Island.

Remarks: This species resembles *Chrosiotes sudabides* (Bösenberg and Strand, 1906) (cf. Yoshida 1982, Zhu 1998) in the shape of the genital organs, and it is hard to distinguish them only by genitalia. However, the superficial appearances of these 2 species are quite different. The abdomen of *C. sudabides* has 2 pairs of horn-like dorsal humps, but that of this species is globular without humps. Their color patterns also differ. The basal color of *C. sudabides* is grayish yellow, and the abdomen has some black flecks, especially the top of the humps being black. By these characters, we consider this species as a new one. It also resembles *C. taiwan* sp. nov., but differs by the shape of the abdomen and the palpal organ. *C. sudabides* (Bösenberg and Strand, 1906) is widely distributed in Japan and China, but has not been recorded in Taiwan. *C. fulvus* sp. nov. and *C. taiwan* sp. nov. are the 2nd records of this genus from Asia.

Etymology: The specific name refers to the basal color.

***Chrosiotes taiwan* sp. nov.**

(Figs. 16-18)

Male: Total length 1.97 to 2.03. Carapace length 0.92 to 0.95; width 0.79. Abdomen length 1.03 to 1.08; width 0.74. First leg: femur 1.58; patella and tibia 1.53; metatarsus 1.34; tarsus 0.63. Second patella and tibia 1.03; 3rd patella and tibia 0.63; 4th patella and tibia 1.11.

Carapace oval. Eyes almost equal in size. AME 4/3 their diameter apart and 1/3 their diameter from ALE. PME 3/2 their diameter apart and 1 from PLE. MOA, anterior width: posterior width: length in the ratio of 5:4:4. Abdomen with a pair of large median depressions dorsally. Embolus long and circular, base thick, tip thin and pointed; conductor large, serving as embolus guide.

Coloration: Basal color brown. Eyes on dark bases. Abdomen grayish brown with dorsal black flecks.

Female: unknown.

Type series: Holotype: ♂, Chungai Bridge, Orchid Island, Taitung County, 18-III-1997, I.M. Tso leg. (THU-Ar-970012). Paratype: 1 ♂, Tienchih, Orchid Island, 17-IV-1997, I.M. Tso leg. (NSMT).

Distribution: Taiwan: Orchid Island.

Remarks. This species resembles *Chrosiotes sudabides* (Bösenberg and Strand, 1906) (cf. Yoshida 1982, Zhu 1998), but is distinguished from the latter by the embolus of the male palpus with straight tip and the abdomen without humps.

Etymology: The specific name is a noun in apposition referring to Taiwan.

***Anelosimus taiwanicus* Yoshida, 1986**

Anelosimus taiwanicus Yoshida, 1986, p. 33, figs. 4-8; Yoshida 1994, p. 140; Zhu 1998, p. 290, fig. 196.

Specimens examined: 1 ♂, 4 ♀ ♀, Orchid Island, 14-VIII-1993, H. Yoshida leg.; 1 ♂, 2 ♀ ♀, Yunghsing Farm, 18-II-1997, I.M. Tso leg. (THU-Ar-970013).

Distribution: Taiwan and Indonesia.

***Theridion xianfengensis* Zhu and Song, 1992**

(Figs. 19-20)

Theridion xianfengensis Zhu and Song, 1992, p. 5, figs. I, J; Zhu 1998, p. 154, fig. 95.

Male: Total length 2.29. Carapace length 1.18; width 0.95. Abdomen length 1.32, width 0.97. First leg: femur 2.34; patella and tibia 2.71; metatarsus 1.92; tarsus 0.5. Second patella and tibia 2.21; 3rd patella and tibia 1.11; 4th patella and tibia 1.29.

Carapace oval with circular median furrow. Diameters of AME: ALE: PME: PLE in the ratio of

10:4:7:6. AME their diameter apart and 1/5 from ALE. PME 6/7 their diameter apart and 5/7 from PLE. ALE and PLE almost touching. MOA, anterior width: posterior width: length in the ratio of 12:10:7. Leg formula: 1, 2, 4, 3. Abdomen longer than wide. Palpal organ as shown in figure 20; embolus crescent shaped.

Coloration: Carapace yellowish brown with faint median and marginal black stripes; eye region blackish brown. Chelicerae, maxillae, and labium brown. Sternum yellowish brown. Legs yellowish brown with many black bands. Abdomen grayish brown; dorsum with black flecks and white pigments; venter with a black band between the epigastric area and spinnerets; spinnerets surrounded with black ring.

Specimens examined: 1 ♂, (THU-Ar-970014), Yunghsing Farm, Orchid Island, Taitung County, Taiwan, 15-IV-1997, 1 ♂, (NSMT), 16-IV-1997, I.M. Tso leg.

Distribution: Taiwan and China.

Chryso orchis sp. nov.

(Figs. 21-25)

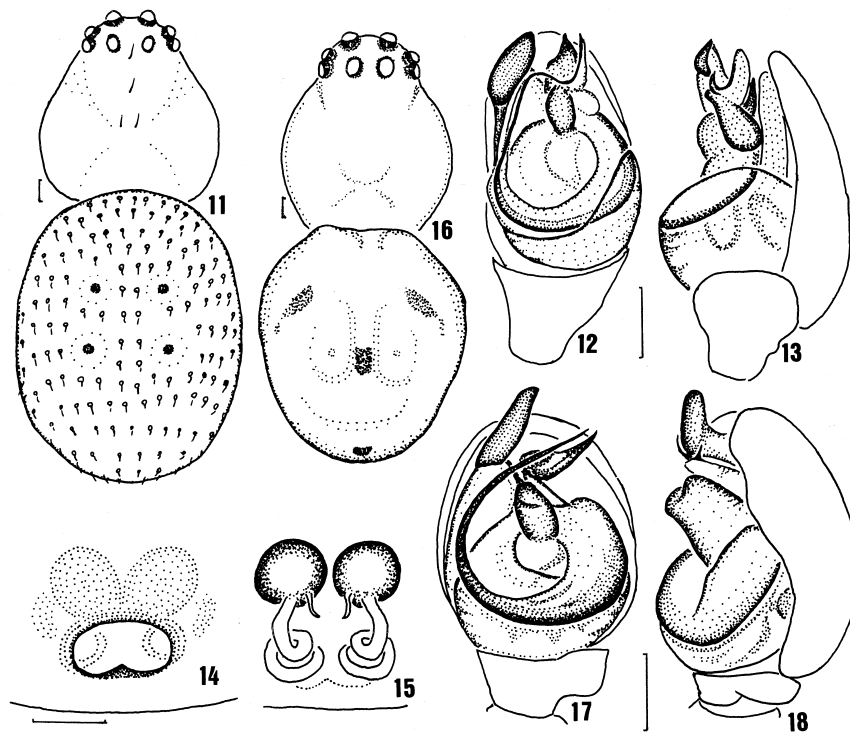
Male: Total length 2.02 to 2.53. Carapace length 0.98 to 1; width 0.89. Abdomen length 1.02 to 1.53,

width 1.11, height 1. First leg: femur 2.26; patella and tibia 2.47; metatarsus 2.42; tarsus 0.79. Second patella and tibia 2; 3rd patella and tibia 0.84; 4th patella and tibia 1.32.

Carapace circular and flattened with circular median furrow. PME larger than the others (by the ratio of 7:6). AME their diameter apart and 2/3 from ALE. PME their diameter apart and 6/7 from PLE. ALE and PLE almost touching. MOA, anterior width: posterior width: length in the ratio of 17:18:14. Legs with many macrosetae. Leg formula: 1, 2, 4, 3. Abdomen longer than wide and high. Palpal organ as shown in figure 23; embolus thin and long, forming a circle; cymbium with apical projection; tibial apophysis large with 2 apical macrosetae.

Coloration: Basal color light yellowish green in life, but in alcohol, greenish part almost decolorized, yellowish white. Carapace with indistinct marginal stripe; eyes on black bases. Tarsi of palpus brown. Distal end of metatarsi brown. Abdomen with 4 pairs of indistinct black flecks.

Female: Total length 2.48 to 2.68. Carapace length 0.93 to 1.11; width 0.95. Abdomen length 1.55 to 1.58; width 1.56; height 1.26. First leg: femur 2.84; patella and tibia 2.84; metatarsus 3.16; tarsus 0.89. Second patella and tibia 1.68; 3rd patella and tibia 1;



Figs. 11-18. 11-15. *Chrosiothes fulvus* sp. nov. 11, male carapace and abdomen, dorsal view; 12, male palpus, ventral view; 13, same, lateral view; 14, epigynum, ventral view; 15, female genitalia, dorsal view. 16-18. *Chrosiothes taiwan* sp. nov. 16, male carapace and abdomen, dorsal view; 17, male palpus, ventral view; 18, same, lateral view. (Scales: 0.1 mm)

4th patella and tibia 1.68.

Diameters of AME: ALE: PME: PLE in the ratio of 4:6:6:7. AME twice their diameter apart and 3/4 from ALE. PME 4/3 their diameter apart and 1 diameter from laterals. MOA, anterior width: posterior width: length in the ratio of 8:10:9. Distal 1/3 of 4th metatarsus and 4th tarsus with long comb. Abdomen without flecks. Genital organ as shown in figures 24-25; epigynum with posterior lobe; with additional seminal receptacles.

Other characters the same as in the male.

Type series: Holotype: ♂, Orchid Island, Taitung County, Taiwan, 15-VIII-1993, H. Yoshida leg. (NSMT). Paratypes: 1 ♂, (THU-Ar-970015), Yung-hsing Farm, Orchid Island, 16-II-1997, 1 ♂, (THU-Ar-970016), 17-II-1997, 1 ♀, (THU-Ar-970017), 17-II-1998, I.M. Tso leg.; 1 ♀, Chungai Bridge, Orchid Island, 16-II-1997, I.M. Tso leg. (NSMT).

Distribution: Taiwan: Orchid Island.

Remarks: This species resembles *Chryso viridiventris* Yoshida, 1996, but is distinguished by the male palpus with thin and inflexible embolus, and the female genitalia with additional seminal receptacles. In *C. viridiventris*, the embolus is large and circular, ventrally bent at 1/3; the female genitalia have a pair of large oval seminal receptacles. The epigynum has a large opening and a large posterior lobe.

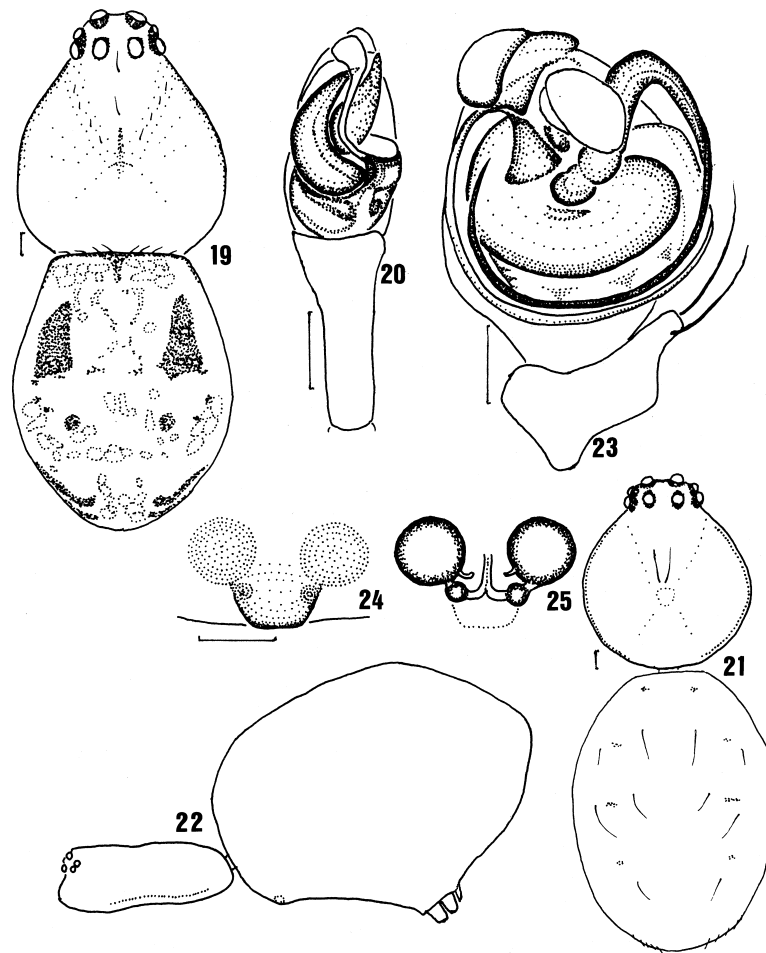
Etymology: The specific name is a noun referring to Orchid Island.

Chryso vesiculosa (Simon, 1894)

Meotipa vesiculosa Simon, 1894, p. 514, figs. 522, 527; Yaginuma 1960, p. 34, pl. 7, fig. 43.

Chryso vesiculosa: Yoshida, 1978, p. 22; Yaginuma 1986, p. 45, pl. 10, fig. 6, text-fig. 24-1; Zhu 1998, p. 51, fig. 25.

Specimen examined: 1 ♀, Chungai Bridge, Orchid Island, Taitung County, Taiwan, 15-IV-1997, I.M.



Figs. 19-25. 19-20. *Theridion xianfengensis* Zhu and Song, 1992. 19, male carapace and abdomen, dorsal view; 20, male palpus, ventral view. 21-25. *Chryso orchis* sp. nov. 21, male carapace and abdomen, dorsal view; 22, female carapace and abdomen, lateral view; 23, male palpus, ventral view; 24, epigynum, ventral view; 25, female genitalia, dorsal view. (Scales: 0.1 mm)

Tso leg. (THU-Ar-970021).

Distribution: Taiwan and Orchid Island, also Japan, China, and Southeast Asia.

***Achaearana lanyuensis* sp. nov.**

(Figs. 26-31)

Male: Total length 2.68 to 3.11. Carapace length 1.37 to 1.42; width 1.16. Abdomen length 1.32 to 1.61; width 1.42; height 1.32. First leg: femur 2.11; patella and tibia 2.11; metatarsus 2.11; tarsus 0.74. Second patella and tibia 1.53; 3rd patella and tibia 1; 4th patella and tibia 1.37.

Carapace oval with triangular median furrow. Diameters of AME: ALE: PME: PLE in the ratio of 12:7:10:10. AME 1/3 their diameter apart and 1/6 from ALE. PME 4/5 their diameter apart and 3/5 from PLE. ALE and PLE almost touching each other. MOA almost square. Leg formula: 1, 2, 4, 3. Abdomen longer than wide and high. Palpal organ as shown in figures 28-29: embolus thin and long, forming a complete circle; conductor thin and long, the tip bent ventrally.

Coloration: Carapace brown with dusky spots. Chelicerae, maxillae and labium brown. Sternum light brown with posterior black flecks. Legs light brown: 4th metatarsi with distal dusky bands. Abdomen grayish dusky brown with white spots and black flecks.

Female: Total length 5.47 to 5.51. Carapace length 2 to 2.16; width 1.84. Abdomen length 3.63 to 3.68; width 2.95; height 3.58. First leg: femur 3.37; patella and tibia 3.21; metatarsus 3.32; tarsus 1.11. Second patella and tibia 2.26; 3rd patella and tibia 1.47; 4th patella and tibia 2.74.

Diameters of AME: ALE: PME: PLE in the ratio of 14:9:12:10. AME 1/2 their diameter apart and 1/7 from ALE. PME 5/6 their diameter apart and 7/12 from PLE. ALE and PLE almost touching. MOA almost square. Leg formula: 1, 4, 2, 3. Abdomen slightly longer than high. Basal color darker than that of male. Carapace blackish brown. Sternum with a posterior black fleck. Legs grayish brown; femora with basal and distal wide dark bands; tibiae and metatarsi with median and distal dark bands. Genital organs: seminal receptacles large; ducts thick and long, forming a circle near the seminal receptacles.

Other characters the same as those of the male.

Type series: Holotype: ♂, Tienchih, Orchid Island, Taitung County, Taiwan, 18-II-1997, I.M. Tso leg. (THU-Ar-970018). Paratypes: 1 ♀, (THU-Ar-970019), Chungai Bridge, Orchid Island, 16-II-1997, 1 ♀, (NSMT), IV-1997, I.M. Tso leg.; 1 ♀, 1 ♂

juvenile, same data as for the holotype (NSMT).

Distribution: Taiwan: Orchid Island.

Remarks: This species resembles *Achaearana culicivora* (Bösenberg et Strand, 1906) described from Japan, but is distinguished by the male palpus with a thin and long conductor and female genitalia with long ducts. In *A. culicivora*, the conductor of the male palpus is thick, and the ducts of the female genitalia are thick and slightly curved to the epigynal opening.

Etymology: The specific name refers to the Chinese name of Orchid Island.

***Achaearana quadrimaculata* sp. nov.**

(Figs. 32-35)

Female: Total length 3.16 to 3.53. Carapace length 1.26 to 1.47; width 1.37. Abdomen length 1.89 to 2.42; width 2.26; height 2.22. First leg: femur 2.16; patella and tibia 2.32; metatarsus 1.84; tarsus 0.74. Second patella and tibia 1.68; 3rd patella and tibia 1.21; 4th patella and tibia 1.79.

Carapace oval. ALE smaller than the others (by the ratio of 3:5). AME 3/5 their diameter apart and 2/5 from ALE. PME 4/5 their diameter apart and 3/5 from PLE. MOA, anterior width: posterior width: length in the ratio of 3:3:2. Abdomen globular. Genital organs as shown in figures 34-35: seminal receptacles large; ducts thick and short.

Coloration: Carapace yellowish brown, eye region dark. Chelicerae, maxillae, and labium brown. Sternum yellowish brown. Coxae, trochanters, and basal femora of legs yellowish brown, femora with dusky longitudinal flecks and distal rings; patellae and tibiae dusky brown; metatarsi brown with basal dusky rings; tarsi brown. Dorsum of abdomen blackish brown with 4 white spots; venter yellowish white; epigynum dark brown.

Male: Unknown.

Type series: Holotype: ♀, Yunghsing Farm, Orchid Island, Taitung County, Taiwan, 15-II-1997, I.M. Tso leg. (THU-Ar-970020). Paratypes: 1 ♀, Chihpen, Taitung County, Taiwan, 16-VII-1977, M. Yoshimura leg. (NSMT).

Other specimens: 1 ♀, Kenting, Pingtung County, Taiwan, 12-VII-1977, M. Yoshimura leg.

Distribution: Taiwan: Taitung County (Orchid Island and Chihpen) and Pingtung County (Kenting).

Remarks: This species resembles *Achaearana oculiprominens* (S. Saito, 1939) (cf. Yoshida 1991, Zhu 1998) described from Japan, but is distinguished by the abdomen with 4 white spots and the ducts of the female genitalia extending from the base to 1/3 of the top of the seminal receptacles. In *A.*

oculiprominentis, the ducts of the female genitalia extend from the base of the seminal receptacles posteriorly, and the abdomen has 2 pairs of lateral transverse bands, a median transverse band, and posterior white pigmented spots.

Etymology: The specific name alludes to the 4 white spots on the abdomen.

***Achaeearanea japonica* (Bosenberg and Strand, 1906)**

Theridion japonicum Bosenberg and Strand, 1906, p. 140, pl. 12, fig. 383; Yaginuma 1960, p. 35, pl. 8, fig. 47.

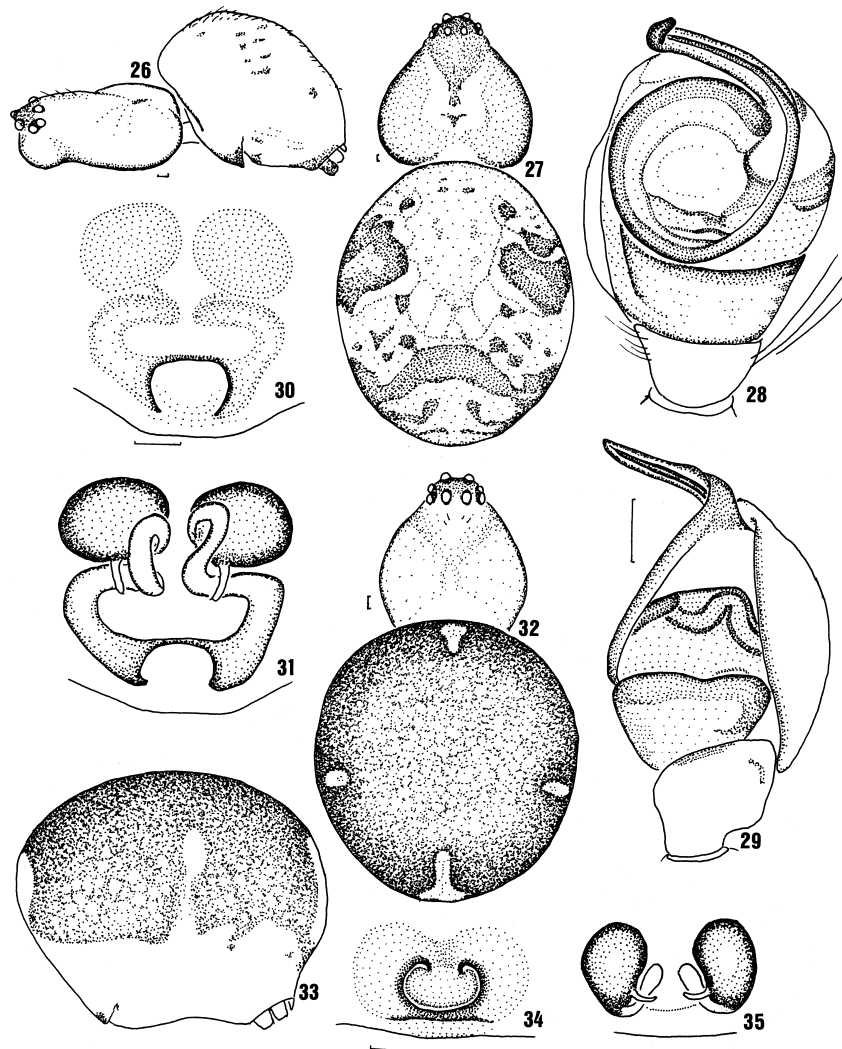
Achaeearanea japonica: Yoshida, 1983, p. 41; Yaginuma 1986 p. 33, pl. 7, fig. 4, text-fig. 19-5; Zhu 1998, p. 89, fig. 51.

Specimens examined: 7 ♀♀, Orchid Island, 14-

VIII-1993, 4 ♀♀, 15-VIII-1993, H. Yoshida leg.

Distribution: Taiwan, China, Japan, and Korea.

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Figs. 26-35. 26-31. *Achaeearanea lanyuensis* sp. nov. 26, male carapace and abdomen, lateral view; 27, female carapace and abdomen, dorsal view; 28, male palpus, ventral view; 29, same, lateral view; 30, epigynum, ventral view; 31, female genitalia, dorsal view. 32-35. *Achaeearanea quadrimaculata* sp. nov. 32, female carapace and abdomen, dorsal view; 33, female abdomen, lateral view; 34, epigynum, ventral view; 35, female genitalia, dorsal view. (Scales: 0.1 mm)

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臺灣蘭嶼產之姬蜘蛛科六新種及一新記錄種描述

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於 1993 及 1997 年間進行之蘭嶼蜘蛛相初步調查共計採得姬蜘蛛科蜘蛛 17 種。其中六種為新種，分別定名為 *Argyrodes nigroris*, *Chrosiothes fulvus*, *Chrosiothes taiwan*, *Chryso orchis*, *Achaeearanea lanyuensis* 及 *Achaeearanea quadrimaculata*。另外，*Theridion xianfengensis* Zhu and Song 1992 為一新記錄種。本文描述此七種新種 / 新記錄種蜘蛛之外部形態，並提供其他十種蜘蛛之形態描述（部份種類）、同種異名及其分布。

關鍵詞：蜘蛛相，新種，蘭嶼，姬蜘蛛科。

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