

A New Japanese Castianeirine Genus (Araneae, Clubionidae) with Presumptive Prototype of Salticoid Eyes

By

Hirotsugu ONO

Department of Zoology, National Science Museum, Tokyo

Abstract A new castianeirine genus and species of the family Clubionidae, *Humua takeuchii*, is described on the basis of material obtained on Ishigakijima Island of the Ryukyu Archipelago, Southwest Japan. Its eyes are peculiar and remind us of those of jumping spiders. It may furnish an evidence for a close relationship between clubionids and salticids in the dionychan spiders.

The eastern edge of the East China Sea is fringed with a number of small islands lying between the two major islands of Kyushu and Taiwan. These Japanese subtropical islands are known to abound in organisms of special zoological interest. Most significant example in araneology is represented by the occurrence of the Mesothelae, the ancestral spiders with segmented opisthosoma as in the fossils of about 300 million years ago. Recent species of the suborder are mainly distributed in Southeast Asia. HAUPT (1979, 1983) revised the Japanese species and arranged them in two genera belonging to the family Heptathelidae, namely *Heptathela* KISHIDA, 1923, and *Ryuthela* HAUPT, 1983, the latter of which seems endemic to the Ryukyus. Another example is a thomisid spider, *Cupa zhengi* ONO et SONG, 1986, distributed in the areas bordering on the East China Sea. This stephanopine species shows unique and most primitive features of the family Thomisidae.

About ten years ago, I obtained a small collection of spiders made by Mr. N. TAKEUCHI in the Yaeyama Islands, southwesternmost islands of the Ryukyu Archipelago. It contained some individuals of a clubionid spider unknown to the Japanese fauna (confer YAGINUMA, 1986), which were collected on Mt. Bannadake of Ishigakijima Island. The external features of the spider, especially the condition of eyes, were so peculiar that I was unable to determine its specific name nor even to find out a genus appropriate for placing the species in the monograph by SIMON (1897–'98). Since then, I have paid attention to its systematic status, always failing in obtaining a satisfactory result. In this short report, a new genus and species will be proposed for the spider, and its peculiarity and phylogenetic relationship with jumping spiders will be discussed.

All the type specimens to be designated will be deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo (NSMT).

The abbreviations used in this paper are as follows: ALE, anterior lateral eye; AME, anterior median eye; AME–AME, distance between AMEs; AME–ALE,

distance between AME and ALE; MOA, median ocular area; PLE, posterior lateral eye; PME, posterior median eye; PME-PME, distance between PMEs; PME-PLE, distance between PME and PLE.

Before going further, I wish to express my sincere thanks to Dr. Shun-Ichi UÉNO of the National Science Museum, Tokyo, for revising the manuscript of this report, and to Mr. Naonori TAKEUCHI, Kanagawa, for his offering of invaluable specimens.

Humua gen. nov.

[Japanese name: Himebachigumo-zoku]

Type species: *Humua takeuchii* sp. nov.

Etymology. Generic name from a dialect "Humu" used in the Yaeyama Islands (type area of the type species), meaning a spider (ANDO, 1971). It is feminine.

Diagnosis. This new genus should belong to the subfamily Castianeirinae which was established by REISKIND (1969) being separated from the Micariinae. (The latter is at present regarded as a subfamily of the Gnaphosidae). The genital structure of *Humua* suggests that the genus stands by *Castianeira* KEYSERLING, 1880, and *Copa* SIMON, 1885, and their relatives, but it is readily distinguished from all the castianeirine genera by the body delicate, light-coloured and not ant-mimicing. In details, the following features are characteristic of the new genus: prosoma flat, longer than wide, and covered with short hairs, with indistinct median furrow; eyes compact and homogenous, anterior median eye much larger than anterior lateral eye, posterior row of eyes strongly procurved in dorsal view; chelicera with two teeth on each margin of fang furrow, distally with promarginal tubercle furnished with several serrated setae; legs with long spines, scopula not developed, all tarsi with developed claw tuft, claws denticulate, leg formula IV-I-II-III; tibia of male palp without apophysis, tarsus with spatulate dorsal setae, embolus spiraled; opisthosoma much longer than wide, without distinct markings; epigynum not much sclerotized, with a pair of long and strong hairs, spermatheca long, in two parts. The genus is at present monotypic.

Humua takeuchii sp. nov.

[Japanese name: Himebachigumo]

(Figs. 1-12)

Description. Measurement. Body length ♀ 4.00-4.37 mm, ♂ 3.56 mm; prosoma length ♀ 1.68-1.71 mm, ♂ 1.41 mm, width ♀ 1.00-1.12 mm, ♂ 0.89 mm; opisthosoma length ♀ 2.22-2.60 mm, ♂ 2.07 mm, width ♀ 0.96-1.08 mm, ♂ 0.78 mm. Lengths (in mm; ♀/♂) of legs in the holotype and allotype:

Leg	Tarsus	Metatarsus	Tibia	Patella	Femur	Total
I	0.44/0.48	0.88/0.92	1.12/1.12	0.52/0.48	1.44/1.32	4.40/4.32
II	0.40/0.40	0.72/0.64	0.92/0.76	0.48/0.36	1.24/1.04	3.76/3.20
III	0.36/0.40	0.72/0.72	0.72/0.72	0.44/0.40	0.96/0.88	3.20/3.12
IV	0.40/0.44	1.20/1.16	1.52/1.48	0.60/0.44	1.68/1.48	5.40/5.00.

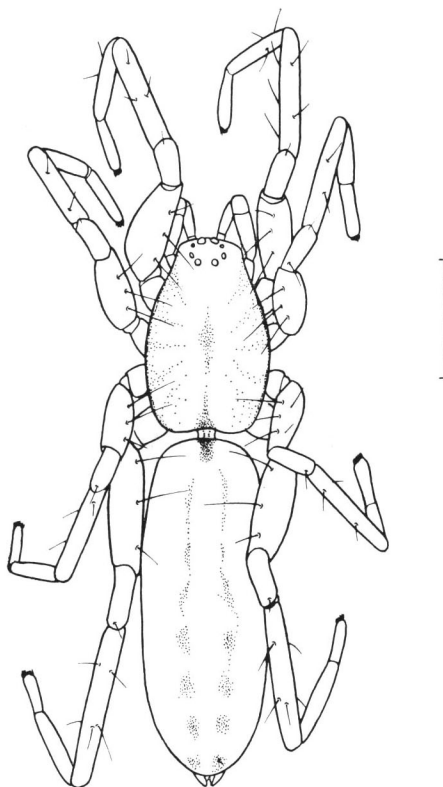
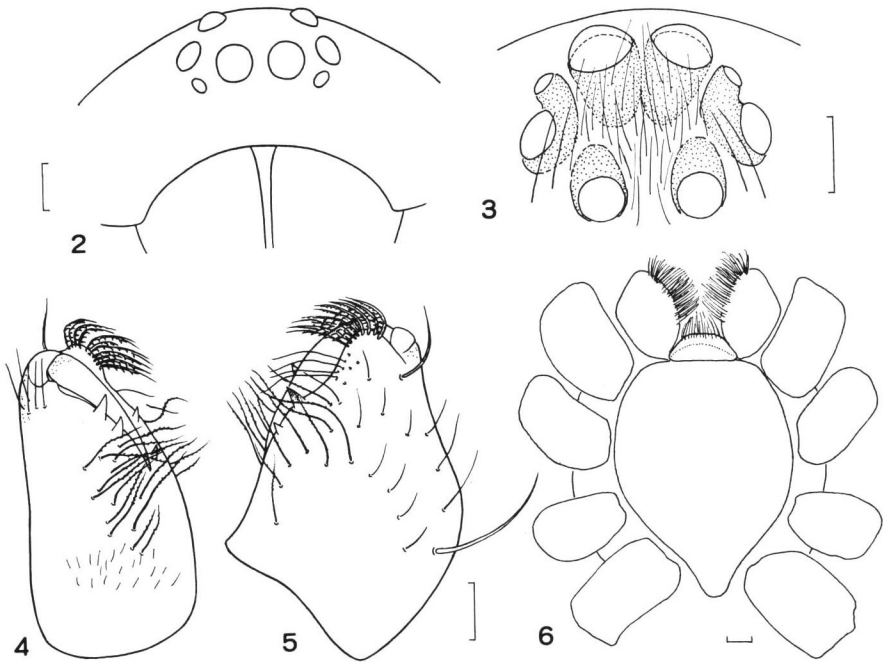


Fig. 1. *Humua takeuchii*
gen. et sp. nov., habitus
of female. (Scale: 1
mm.)

Prosoma. Much longer than wide (length/width ♀ 1.53–1.68, ♂ 1.58), flat, covered with short hairs; eyes compact and homogenous, anterior row strongly recurved, posterior row strongly procurved (Fig. 3), AME > PME = PLE > ALE, AME much larger than ALE (AME/ALE ♀ 1.71–2.00, ♂ 2.00), PME and PLE equal in size, AME–AME/AME–ALE ♀ 1.00–1.34, ♂ 1.00, PME–PME/PME–PLE ♀ 1.50–2.00, ♂ 1.00, AME/AME–AME ♀ 3.00, ♂ 6.00, PME/PME–PME ♀ 0.66–0.76, ♂ 1.00, MOA longer than wide (length/width ♀ 1.11–1.16, ♂ 1.25), wider behind than in front (anterior width/posterior width ♀ 0.77–0.85, ♂ 0.88), clypeus/AME–AME ♀ 3.00–4.00, ♂ 6.00. Chelicera short, with two teeth on each margin of fang furrow, a promarginal tubercle present in the distal part, furnished with about ten serrated setae (Figs. 4–5); labium wider than long (length/width ♀ 0.40–0.50, ♂ 0.50), maxillae almost parallel, with scopula, sternum cordate, longer than wide (length/width ♀ 1.26–1.33, ♂ 1.59) (Fig. 6). Leg formula IV–I–II–III, notch of trochanter IV absent; female palp with a tarsal claw.

Spiniformation of legs. ♀ (Holotype):— femur: I–IV dorsal 1–1–1, I prolateral 0–0–1, II prolateral and III–IV retrolateral each 0–0–0–1, II retrolateral and III prolateral 0–1–0–1; patella: I–IV dorsal 1–0–1 (weak); tibia: I–IV dorsal 0–1,



Figs. 2-6. *Humua takeuchii* gen. et sp. nov. — 2. Eyes, frontal view. 3. Eyes, dorsal view. 4. Right chelicera, ventral view. 5. Same, lateral view. 6. Maxillae, labium, sternum and coxae of legs, ventral view. (Scale: 0.1 mm.)

prolateral 1-1, I-III retrolateral 1, IV retrolateral 1-1, I-II ventral 2-2-2-0, III ventral 2-1-2, IV ventral 1-2-0; metatarsus: I-III pro- and retrolateral each 1-0, IV pro-lateral 1-1-0, retrolateral 1-1-1, I-II ventral 2-1, III ventral 2-0, IV ventral 1-0.

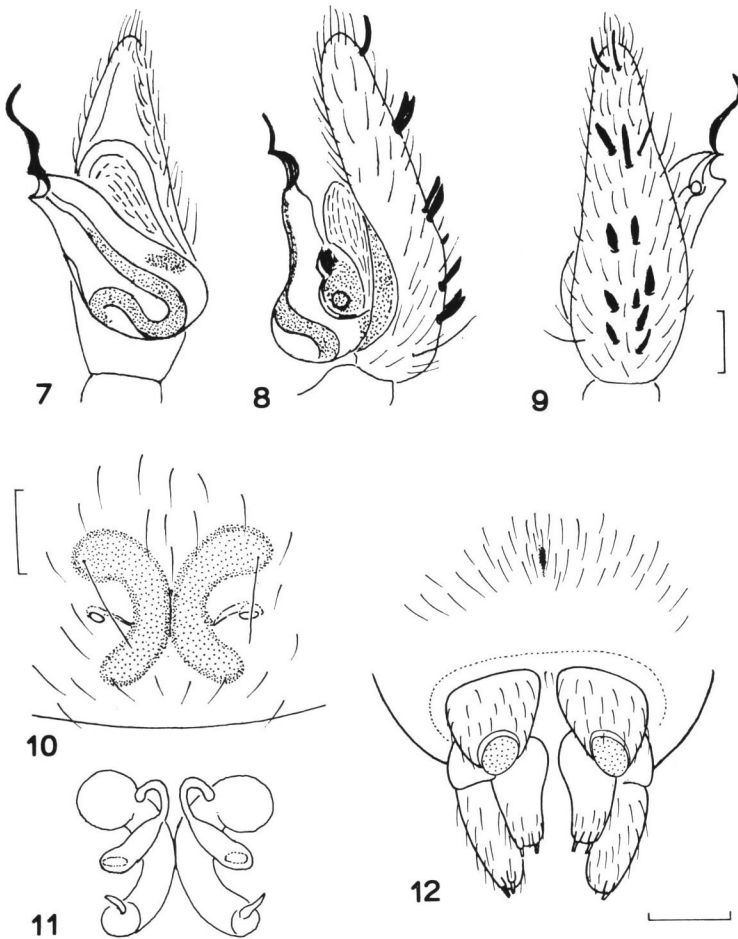
♂ (Allotype):— femur: I-IV dorsal 1-1-1, I prolateral 0-0-1, III pro- and retrolateral and IV retrolateral each 0-0-1; patella: III-IV dorsal 1-0-1 (weak); tibia: I-IV dorsal 1-0, I pro- and retrolateral and II retrolateral each 1, II-IV prolateral and IV retrolateral each 1-1, III retrolateral 1-0, I ventral 2-2-2-0, II ventral 1-1-0, III-IV ventral 0-2-2-2 (apical); metatarsus: I-III pro- and retrolateral each 1-0, IV pro- and retrolateral 1-1-1, I-II ventral 2-2, III-IV ventral 2-0.

Male palp (Figs. 7-9). Tibia without apophysis. Tarsus dorsally with 12 spatulate setae; bulb fig-shaped, embolus long and spiraled.

Opisthosoma. Much longer than wide (length/width ♀ 2.30-2.41, ♂ 2.66), without sclerotized plate. Spinnerets (Fig. 12): anterior pair conical and short, median pair as large as posterior pair, median and posterior pairs distally with spigots.

Female genitalia (Figs. 10-11). Epigynum not much sclerotized, with a pair of long and strong hairs; spermatheca long, in two parts; intromittent canal short and tubular.

Coloration and markings. ♀♂: Prosoma, mouthparts, palps and legs light



Figs. 7-12. *Humua takeuchii* gen. et sp. nov. — 7. Male palp, ventral view. 8. Same, retro-lateral view. 9. Same, dorsal view. 10. Epigynum. 11. Female genitalia, dorsal view. 12. Spinnerets. (Scale: 0.1 mm.)

yellowish brown, opisthosoma yellowish white without distinct markings, individually with some indistinct brown spots.

Type series. Holotype: ♀, allotype: ♂, and 1 ♀ 1 juv. paratypes, Mt. Bannadake, Ishigakijima Island, Yaeyama Islands, Okinawa Pref., Ryukyu Archipelago, by beating method, 29-III-1976, N. TAKEUCHI leg. (NSMT-Ar 1281-1283).

Range. Known only from the type locality.

Biology. Unknown. The specimens were obtained by beating method.

Etymology. Named after Mr. Naonori TAKEUCHI, Kanagawa.

Remarks. At species level, there is no described spider related to this new species.

Discussion

This new clubionid spider shows the general characteristics of the subfamily Castianeirinae, especially in the basic conformation of the genital organ. In the male palp, the tarsus is long and bears a large cymbium, the bulb has an expanded base and a narrower distal part with a sclerotized embolus, and the bulbar duct is coiled and visible in ventral view. The structure of the female genitalia is also similar to that of the genus *Castianeira* and its relatives. The only discriminative point in the genital organ of *Humua* is the presence of a number of spatulate dorsal setae on the palpal tarsus and a pair of strong hairs on the epigynum.

However, the body of the new spider has some features widely different from those of the other castianeirine genera. It is pale-coloured and not ant-mimicing. The condition of eyes is unique; all AMEs lie close together, AME is developed and much larger than reduced ALE, and the posterior row of eyes is so strongly procurved that the eight eyes appear as if they are arranged in three rows. Besides, the ocular area is covered with many long hairs. If the ocular area extends more posteriorly and occupies the anterior half of prosoma, the eyes may show an arrangement exactly similar to those in the Salticidae. Therefore, it can be considered that the clubionid spider represents a prototypal condition of eyes of jumping spiders.

The current hypothesis is that the Salticidae were branched off from the main dionychan line of the genealogical tree at the earliest time, while the Clubionidae and Gnaphosidae are regarded as the groups closely related to each other (BRISTOWE, 1958). However, as PETRUNKEVITCH (1933) pointed out after an anatomical study that clubionid spiders have many important features in common more with salticids than with gnaphosids. Though the origin of jumping spiders, the Salticoidea (Salticidae and Lyssomanidae), has not yet been satisfactorily clarified (LEHTINEN, 1967), their unique eyes seem to have been overestimated in analysing interfamilial relationships. Judging from the similarity in the condition of eyes as well as in other features including the simple conformation of genital organ, it can be concluded that the Clubionoidea and Salticoidea form a group among the dionychan spiders. In both the superfamilies, many ant-mimicing species are known. It is expected that the genus *Humua* will furnish an evidence for a close relationship between the clubionids and salticids.

References

- ANDO, T., 1971. In YANAGISAWA, Z., On derivation and meaning of the Japanese word kumo. *Atypus*, Osaka, (56): 1-8. (In Japanese.)
- BRISTOWE, W. S., 1971. *The World of Spiders* (rev. ed.). xvi+304 pp. Collins, London.
- HAUPT, J., 1979. Lebensweise und Sexualverhalten der mesothelen Spinne *Heptathela nishihirai* n. sp. (Araneae, Liphistiidae). *Zool. Anz.*, **202**: 348-374.
- 1983. Vergleichende Morphologie der Genitalorgane und Phylogenie der liphistiomorphen Webspinnen (Araneae: Mesothelae). I. Revision der bisher bekannten Arten. *Z. zool. Syst. Evolut.-forsch.*, **21**: 275-293.
- KEYSERLING, E., 1880. Neue Spinnen aus Amerika. I. *Verh. zool.-bot. Ges. Wien*, **29**: 293-349.

- KISHIDA, K., 1923. *Heptathela*, a new genus of liphistiid spiders. *Annot. zool. japon.*, **10**: 235–242.
- LEHTINEN, P. T., 1967. Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Araneomorpha. *Ann. zool. fenn.*, **4**: 199–468.
- ONO, H., & D. SONG, 1986. A new Sino-Japanese species of the genus *Cupa* (Araneae, Thomisidae) from the coastal areas of the East China Sea. *Bull. natn. Sci. Mus., Tokyo, (A)*, **12**: 25–29.
- PETRUNKOVITCH, A., 1933. An inquiry into the natural classification of spiders, based on a study of their internal anatomy. *Trans. Conn. Acad. Arts Sci.*, **31**: 299–389.
- REISKIND, J., 1969. The spider subfamily Castianeirinae of North and Central America (Araneae, Clubionidae). *Bull. Mus. comp. Zool.*, **138**: 163–325.
- SIMON, E., 1885. Études arachnologiques. 18^e mémoire. XXVI. Matériaux pour servir à la faune des Arachnides du Sénégal. *Ann. Soc. ent. Fr.*, (6), **5**: 345–396.
- 1897–'98. Histoire Naturelle des Araignées. Deuxième édition. **2** (1) (pp. 1–192) (1897), **2** (2) (pp. 193–380) (1898). Roret, Paris.
- YAGINUMA, T., 1986. Spiders of Japan in Color (n. ed.). xxiv+405 pp. Hoikusha, Osaka. (In Japanese.)

