

# First description of the female of *Robertus nipponicus* Yoshida 1995 (Araneae: Theridiidae) with additional morphological information of the male

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**Abstract** — *Robertus nipponicus* Yoshida 1995 (Araneae: Theridiidae) was described using a male specimen collected from Kumamoto Prefecture, Japan, and additional specimens, including females, have never been obtained since the original description. In this paper, we described the female of *R. nipponicus* for the first time, using specimens collected from Kochi Prefecture, Japan. Females of this species can be distinguished from those of the congeners, *R. sibiricus* Eskov 1987, *R. ussuricus* Eskov 1987, and *R. mediterraneus* Eskov 1987, by the narrow, transversely longer, and inverted v shaped copulatory openings. We also provided additional morphological information of the male.

**Key words** — Copulatory openings, holotype, Kochi Prefecture, female

## Introduction

The genus *Robertus* O. Pickard-Cambridge 1879 (Araneae: Theridiidae) is composed of small ground-dwelling spiders that weave gum-footed tangle webs under stones or dead leaves (Yoshida 2003; Suzuki 2017). To date, six species of the genus have been recorded in Japan: *R. kastoni* Eskov 1987, *R. nipponicus* Yoshida 1995, *R. nojimai* Yoshida 2002, *R. ogatai* Yoshida 1995, *R. saitoi* Yoshida 1995, and *R. sibiricus* Eskov 1987 (Tanikawa 2020). Among them, *R. nipponicus* was described using a single male specimen collected from Kumamoto Prefecture, Kyushu, without the description of female, and additional specimens have never been obtained since the original description (Yoshida 1995, 2003, 2009). Therefore, the female of this species is still unknown.

Recently, we collected a male and several female *Robertus* specimens from Kochi Prefecture, Shikoku, Japan. As a result of observations, we could safely identify the male as *R. nipponicus*. As no other candidates were sympatric, we regarded these females as conspecific to *R. nipponicus*. In this paper, we describe the female of this species for the first time. We also provided additional morphological information of the male.

## Materials and Methods

We examined the holotype of *R. nipponicus* Yoshida 1995 (male adult), deposited in the collection of the Department of Zoology, National Museum of Nature and Science, Tsukuba, and five fresh specimens (one male and four fe-

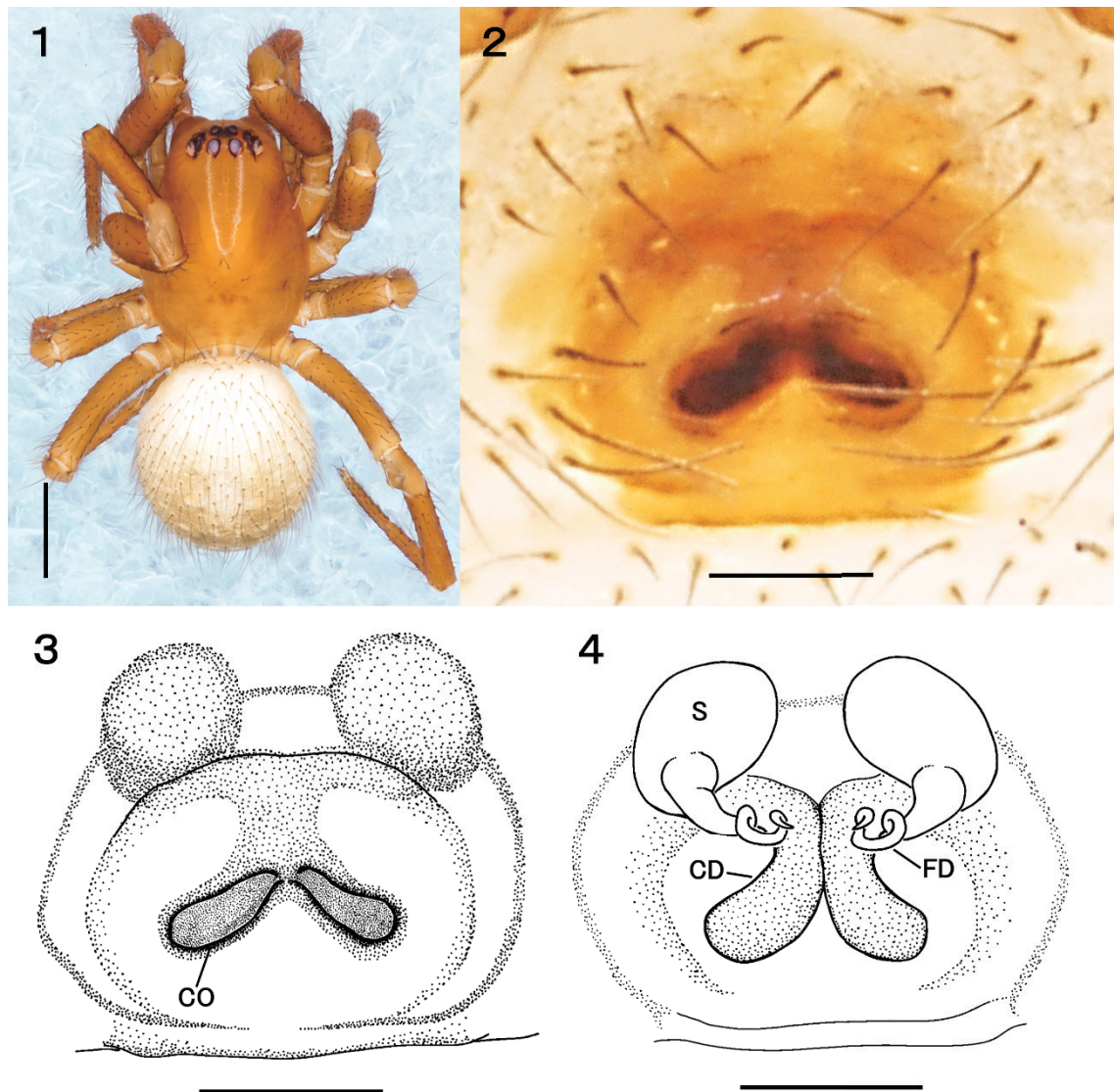
males) collected from Kochi Prefecture, Japan. Specimens collected from Kochi Prefecture were preserved in 80% (v/v) ethanol. The morphology of the specimens was observed under a stereoscopic microscope (Nikon AZ100M, Japan), and photographs taken by the device were stacked using microscope imaging software (Nikon NIS-Elements D 4.20.00 64-bit, Japan). The measurements are given in millimeters. Measurements of the legs are given in the following format: [femur + patella + tibia + metatarsus + tarsus = total]. The specimens used in this study were deposited in the collection of the Department of Zoology, National Museum of Nature and Science, Tsukuba (NSMT), or the personal collection of Ryohei Serita (RS per. col.). Abbreviations used in this paper are as follows: ALE, anterior lateral eye; AME, anterior median eye; PME, posterior median eye; PLE, posterior lateral eye. The names of each part of the genital organs were in accordance with Yoshida (1995, 2003).

## Taxonomy

*Robertus nipponicus* Yoshida 1995  
[Japanese name: Minami-mori-himegumo]  
(Figs. 1–10)

*Robertus nipponicus* Yoshida, 1995, p154, figs. 5–6 [male holotype from Kumamoto, Japan, examined]; Yoshida 2003, p30, figs. 38–39; Yoshida 2009, p360, figs. 35–36.

**Specimens examined.** Holotype ♂ (NSMT-Ar 3315), Ikeda, Kumamoto-shi, Kumamoto Prefecture, 10-VI-1985,



**Figs. 1–4.** *Robertus nipponicus* Yoshida 1995 (NSMT-Ar 20920). 1, Habitus of female, dorsal view; 2–3, epigyne, ventral view; 4, internal genitalia, dorsal view. Abbreviations: CD, copulatory ducts; CO, copulatory openings; FD, fertilization ducts; S, spermatheca. Scales = 0.5mm (1), 0.1mm (2–4).

T. Irie leg.; 2♀1♂, Yoshiuno-otsu, Tsuno-cho, Takaoka-gun, Kochi prefecture, 11-II-2019 (1♀: NSMT-Ar 20920), 30-XI-2020 (1♀: NSMT-Ar 20921, 1♂: NSMT-Ar 20922), R. Serita leg.; 1♀ (RS per. col.), Usachoryu, Tosa-shi, Kochi Prefecture, 18-II-2020 R. Serita leg., 1♀ (RS per. col.), Kagamiyoshihara, Kochi-shi, Kochi Prefecture, 16-XI-2019, R. Serita leg.

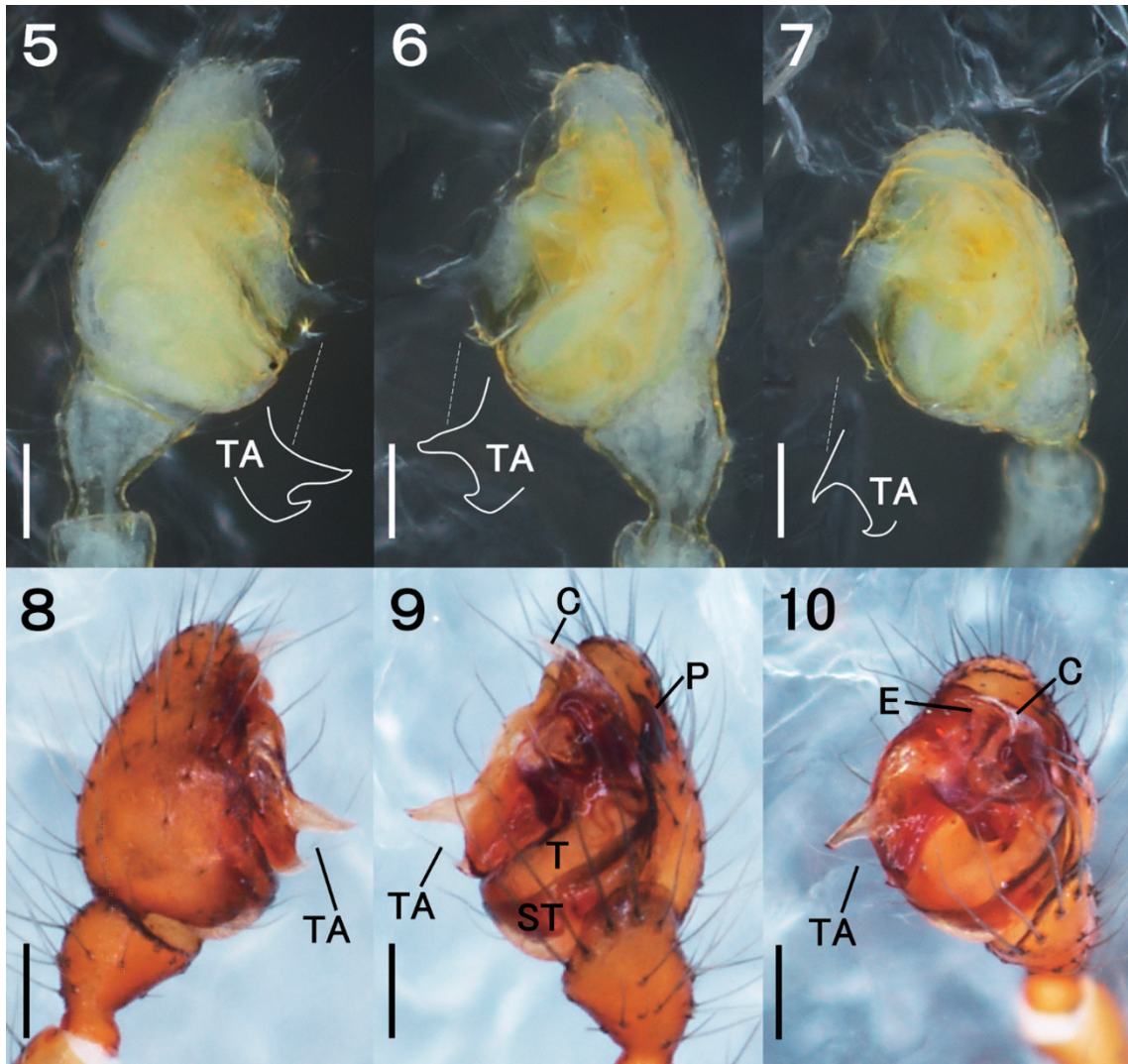
**Diagnosis.** Females of this species slightly resemble *R. sibiricus* Eskov 1987, *R. ussuricus* Eskov 1987, and *R. mediterraneus* Eskov 1987 in having the large copulatory openings on the center of the epigynal plate but can clearly be distinguished by the narrower, transversely longer, and

inverted v shaped copulatory openings (Figs. 2, 3). The position of the copulatory opening and the shape of the copulatory ducts are also useful to distinguish them. The copulatory openings of *R. nipponicus* are located far below the spermathecae (Figs. 3, 4), whereas those of *R. sibiricus* and *R. ussuricus* are very close to the spermathecae (Eskov 1987). Although the relative position of the copulatory openings and spermathecae of *R. nipponicus* is similar to that of *R. mediterraneus*, it can be distinguished by the X-shaped copulatory ducts (Fig. 4; Y-shaped in *R. mediterraneus*).

**Description of female** (NSMT-Ar 20920; Figs. 1–4).

**Measurements.** Body 2.53 long; Carapace 1.31 long, 0.98





**Figs. 5–10.** *Robertus nipponicus* Yoshida 1995 (holotype: NSMT-Ar 3315, 5–7; NSMT-Ar 20922, 8–10). 5, 8, Male left palp, prolateral view; 6, 9, same, retrolateral view; 7, 10, same, anterior-ventral view. Abbreviations: C, conductor; P, paracymbium; ST, subtegulum; T, tegulum; TA, tegular apophysis. Scales = 0.1mm.

wide. Eye size: AME 0.06; ALE 0.09; PME: 0.10; PLE 0.09. Distance between eyes: AME-AME 0.03, AME-ALE 0.05, PME-PME 0.06, PLE-PLE: 0.01. Length of legs: leg I:  $1.05 + 0.43 + 0.81 + 0.61 + 0.49 = 3.39$ ; leg II:  $0.87 + 0.34 + 0.66 + 0.49 + 0.45 = 2.81$ ; leg III:  $0.68 + 0.27 + 0.47 + 0.40 + 0.38 = 2.20$ ; leg IV:  $0.99 + 0.35 + 0.85 + 0.58 + 0.49 = 3.26$ . Abdomen 1.45 long, 0.99 wide.

Carapace oval and longer than wide [length of carapace divided by width of carapace 1.34]. Chelicerae with three teeth on the anterior margin. Abdomen oval and longer than wide [length of abdomen divided by width of abdomen 1.46].

Coloration and markings (Fig. 1). Carapace, chelicerae, maxillae, labium, sternum, and legs reddish brown (turning

yellowish brown in ethanol). Eyes on the dark bases. Legs lacking annulation. Abdomen pale yellowish gray, dorsum of abdomen with two pairs of sigilla.

Genital organs (Figs. 2–4). Epigyne with oval plate slightly wider than long. Copulatory openings narrow and transversely longer, narrowest in the middle. Contour of copulatory openings inverted v shaped. Copulatory openings and spermathecae apart from each other. Spermathecae oval. Copulatory ducts short, simply curved, and x-shaped. Fertilization ducts with helical tips.

Variations. Body length (based on 4 females): 1.92–2.53. There is a variation in the color of the abdomen: some individuals with dark gray abdomen, while others with pale

yellowish gray.

**Remarks.** The males and females are considered to be the same species because no other candidates were sympatric.

**Habitat.** This species has been collected under rocks on forest floors.

**Distribution.** Japan (Kochi and Kumamoto Prefectures).

**Additional morphological information of male.** The entire body of the holotype male was discolored, but the characteristics of the male palp were visible: embolus and conductor thick, narrower distally; cymbium with a hook-shaped paracymbium; tegular apophysis with two large ventral projections (Yoshida 1995; Figs. 5–7). Tegular apophysis was formerly referred to as median apophysis but renamed by Yoshida (2003) in accordance with Levi and Levi (1962). Although not documented in the original description, we found that the anterior projection of the tegular apophysis was longer and almost straight, while the posterior projection was shorter and strongly curved anteriorly (Figs. 5–7; shown as drawings with white lines). See Yoshida (1995) for further information on the male descriptions.

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