

## Two New Six-eyed Spiders of the Genera *Orchestina* and *Comaroma* (Araneae, Oonopidae and Anapidae) from Japan

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**Abstract** Two new species of the spider genera *Orchestina* Simon, 1882 (Oonopidae) and *Comaroma* Bertkau, 1889 (Anapidae) are described from Japan under the names *Orchestina flava* (from Okinoerabu-jima Island, Kagoshima Prefecture) and *Comaroma hatsushibai* (from Ôdaigahara-zan, Nara Prefecture). Being a member of the haplogyne group, *Orchestina flava* originally has six eyes, while *Comaroma hatsushibai* seems to be exceptionally six-eyed as the result of reduction of anterior median eyes.

**Key words:** Taxonomy, Araneae, Oonopidae, Anapidae, new species, Japan.

The present paper deals with the result of a taxonomical study on two species of six-eyed spiders of the genera *Orchestina* Simon, 1882 (Family Oonopidae) and *Comaroma* Bertkau, 1889 (Family Anapidae) recently obtained from Okinoerabu-jima Island, Kagoshima Prefecture and from Mt. Ôdaigahara-zan, Nara Prefecture, Japan. These are regarded as new to science and described herein under the names *Orchestina flava* and *Comaroma hatsushibai*.

Spiders of the genus *Orchestina* are very small in size (1–2 mm) and are found in the leaf-litter and cavities on the ground, under the bark of trees as well as in dark places of buildings. About 35 species have been known mainly from the old world. Of these 11 species are known from Asian countries as Bhutan, Sri Lanka, the Philippines, Vietnam, China and Japan (Simon, 1893, 1909; Dalmis, 1916; Oi, 1955, 1958; Brignoli, 1978; Xu, 1987). Up to the present, two species, *Orchestina sanguinea* Oi, 1955 and *O. okitsui* Oi, 1958, have been recorded under the genus in Japan. The new species found on Okinoerabu-jima Island in southwestern Japan seems to be related to a Chinese species rather than the above Japanese known ones.

The genus *Comaroma* is a rare group in anapid spiders including only four species from the

world, that is, *C. simonii* Bertkau, 1889 from Europe, *C. mendocino* (Levi, 1957) from North America, *C. nakahirai* (Yaginuma, 1959) from Japan, and *C. tongjunca* Zhang et Chen, 1994 from China. Of these, *Comaroma simonii* seems mostly resemble the new species of Japan, but both are easily distinguishable from each other by the structure of male and female genital organs.

The abbreviations of morphological terms used in this paper are as follows: ALE, anterior lateral eye; AME, anterior median eye; ME, median eye; PLE, posterior lateral eye; PME, posterior median eye; PME-PME, distance between PMEs; PME-PLE, distance between PME and PLE.

Type specimens of the new species described herein are deposited in the collection of the Department of Zoology, National Science Museum, Tokyo (NSMT).

Before going further, I wish to express my hearty thanks to Mr. Shingo Hatsushiba and his wife Mrs. Ryô Kôno, for offering invaluable specimens. This study was supported in part by the Grant-in-aid No. 16540431 for Scientific Research from the Ministry of Education, Science, Sports and Culture, Japan.

## Descriptions of New Species

Family Oonopidae

*Orchestina flava* sp. nov.

[Japanese name: Ki-hanegumo]

(Figs. 1–10)

*Diagnosis.* This new species seems closely related to *Orchestina thoracica* Xu, 1987 described from Mt. Moshan, Tunxi, Anhui Province of China, but can be distinguished from the latter species by the shape of the apophysis of male maxilla, the size of tibia of male palp (much thinner than that of the latter), and the shape of female genitalia (cf. Figs. 3–7, 9–10 and Xu, 1987, figs. 3, 9, 11, 12). From the known Japanese species of the genus, *Orchestina sanguinea* Oi, 1955 and *O. okitsui* Oi, 1958, the new species can be easily distinguishable with the coloration and markings of the pro- and opisthosomata.

*Type specimens.* Male holotype, female allotype and 6 females and 6 males paratypes from China-chô, 150 m in elevation, Okinoerabu-jima Island, Amami Islands, Kagoshima Prefecture, Japan, 20–I–2005, by sifting leaf-litter in broad-leaved forest, H. Ono leg. (NSMT-Ar 5674–5678).

*Description.* Measurements are based on the male holotype and the female allotype. Female: Body length 1.27 mm; prosoma length 0.62 mm, width 0.47 mm; opisthosoma length 0.67 mm, width 0.62 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 1.72 mm (0.51+0.15+0.43+0.43+0.20), II 1.84 mm (0.53+0.15+0.48+0.48+0.20), III 1.20 mm (0.36+0.12+0.27+0.30+0.15), IV 1.74 mm (0.59+0.15+0.38+0.43+0.19). Male: Body length 1.10 mm; prosoma length 0.57 mm, width 0.42 mm; opisthosoma length 0.54 mm, width 0.52 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 1.65 mm (0.45+0.14+0.44+0.42+0.20), II 1.74 mm (0.53+0.15+0.45+0.40+0.21), III 1.19 mm (0.35+0.12+0.24+0.30+0.18), IV 1.66 mm (0.54+0.15+0.31+0.45+0.21).

Prosoma (Figs. 1–2). Carapace: longer than

wide (length/width female 1.32, male 1.36), with long setae, median furrow absent. Eyes: ME>PLE>ALE (7:5:4 in size) in female and male, median eyes largest and close to each other, both the lateral eyes also close to each other, clypeus equal to the diameter of MA and furnished with two pair of long setae (Fig. 2). Chelicerae: simple, without distinct teeth, labium: ovate, wider than long (length/width 0.61 in female, 0.70 in male), sternum: as long as wide in female, slightly wider than long in male (length/width 0.95). Lateral part of the male maxilla with a spiniform apophysis strongly sclerotized and peculiar in shape with minutely serrated lateral margin (Fig. 3–4). The lateral margin of the female maxilla is weakly sclerotized (Fig. 5). Legs furnished with many strong hairs, but without spines, femur of the fourth leg very large and expanded, claws of the legs with several teeth.

Male palp (Figs. 8–10): femur as long as tibia, tibia not expanded, with a long spine, cymbium short; bulb pyriform, very large and expanded, with short embolus.

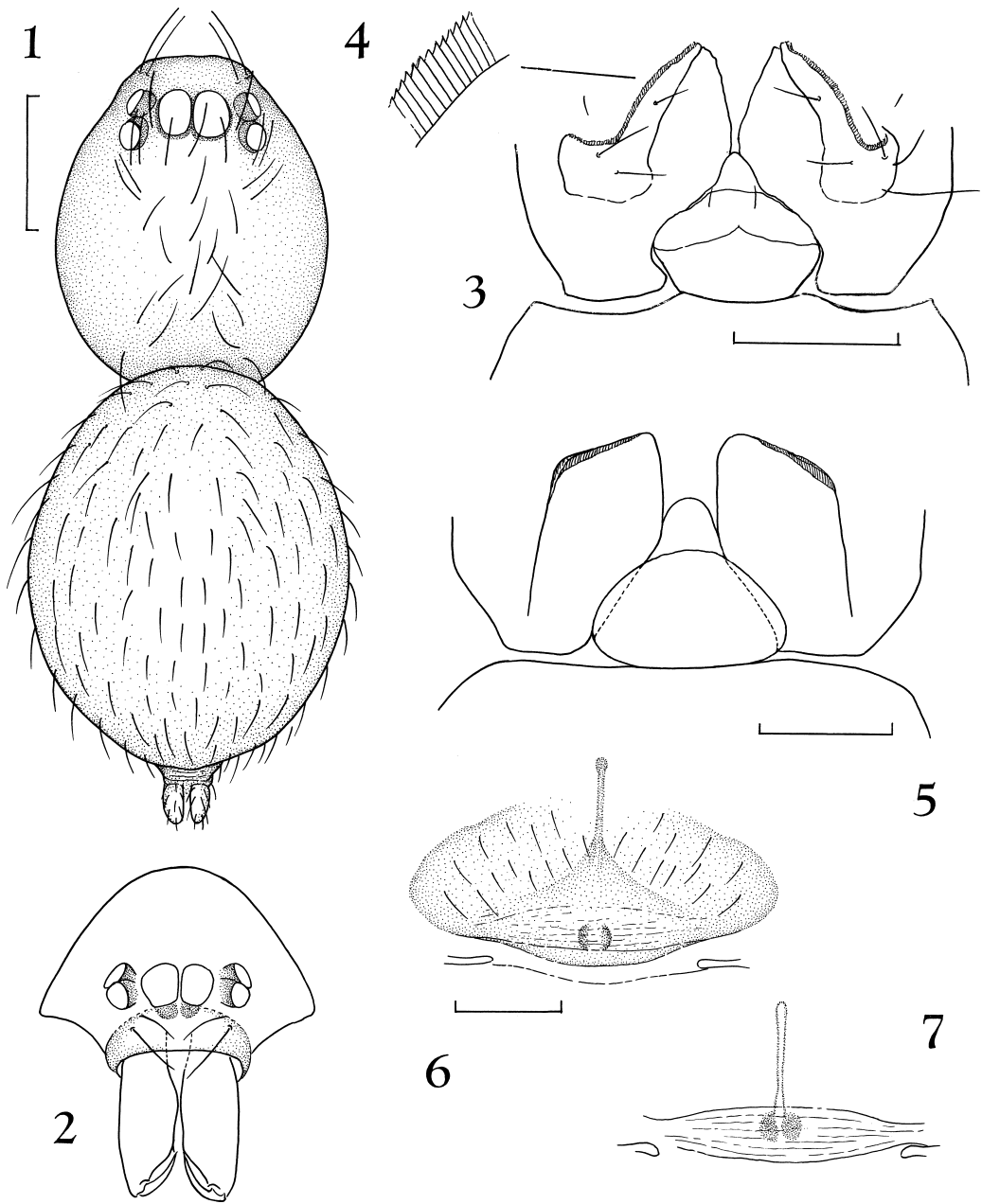
Opisthosoma (Fig. 1): oval, slightly longer than wide (length/width female 1.08, male 1.04), with many long hairs. Anterior spinneret with two segments and much larger than the posterior one.

Female genitalia (Figs. 6–7): clearly recognizable with the opening in the posterior part, the narrow internal structure visible through slightly sclerotized surface.

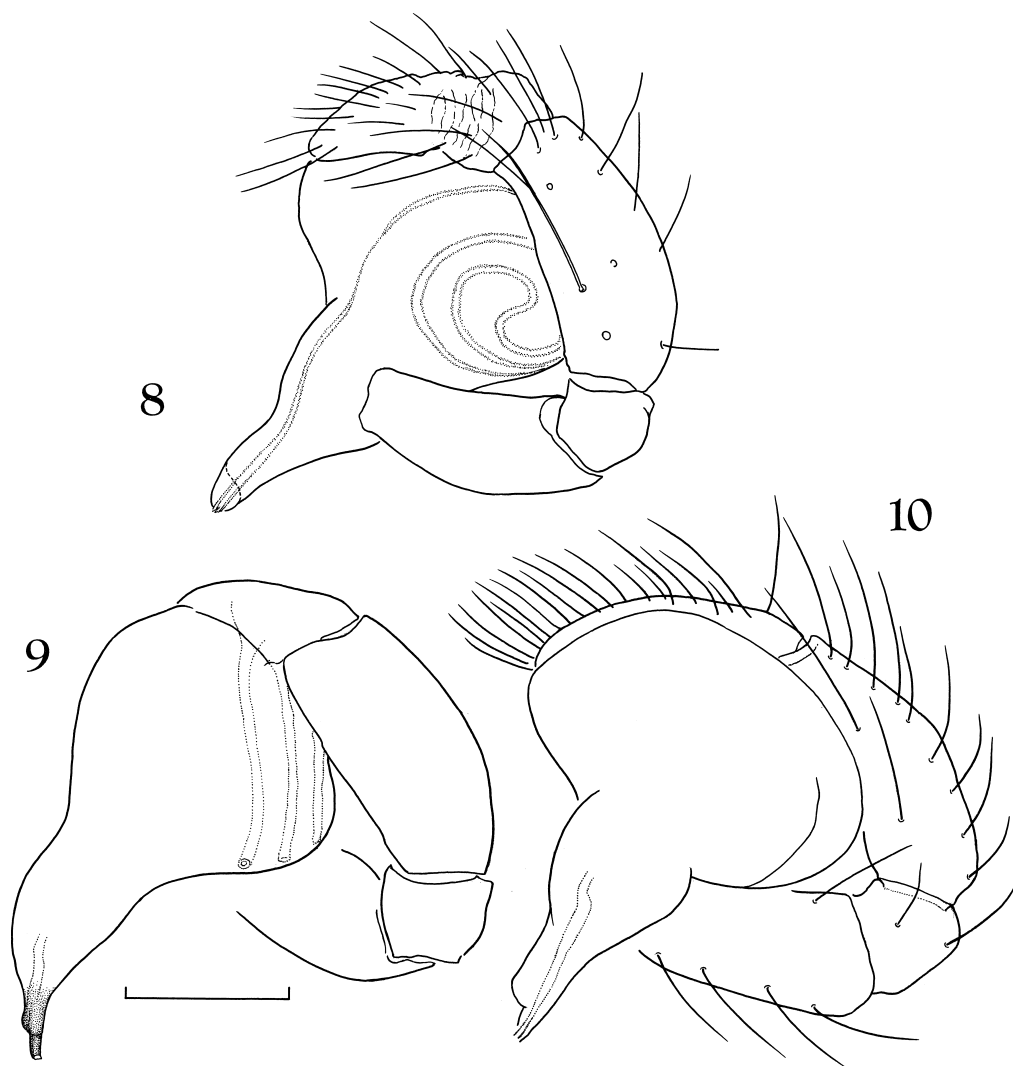
Coloration and markings: Female and male: carapace white, posterior part light yellow, maxillae, labium, sternum and all appendages pale yellowish white, opisthosoma white in alcohol, but pure yellow in nature.

*Distribution.* Known only from the type locality.

*Remark.* The species name is Latin meaning yellow and derived from its coloration. *Orchestina nipponica* Kishida, *nomen nudum*, cited in Fukasawa (1940) and Yaginuma (1960) seems to be the same species as *O. sanguinea* Oi, 1955.



Figs. 1–7. *Orchestina flava* Ono, sp. nov.: 1–4, male holotype (NSMT-Ar 5674), 5–7, female allotype (NSMT-Ar 5675). — 1, Pro- and opisthosomata, dorsal view; 2, prosoma, frontal view; 3, 5, labium and maxillae, ventral view; 4, margin of the right maxilla, lateral view; 6, female genitalia, ventral view; 7, female genitalia, posterior view. [Scales: Figs. 1–2, 0.2 mm; Figs. 3–7, 0.1 mm.]



Figs. 8–10. *Orchestina flava* Ono, sp. nov., male holotype (NSMT-Ar 5674). — 8, Right palp, prolateral view; 9, left palp, retrolateral view; 10, left palp, ventral view. [Scale: 0.1 mm.]

#### Family Anapidae

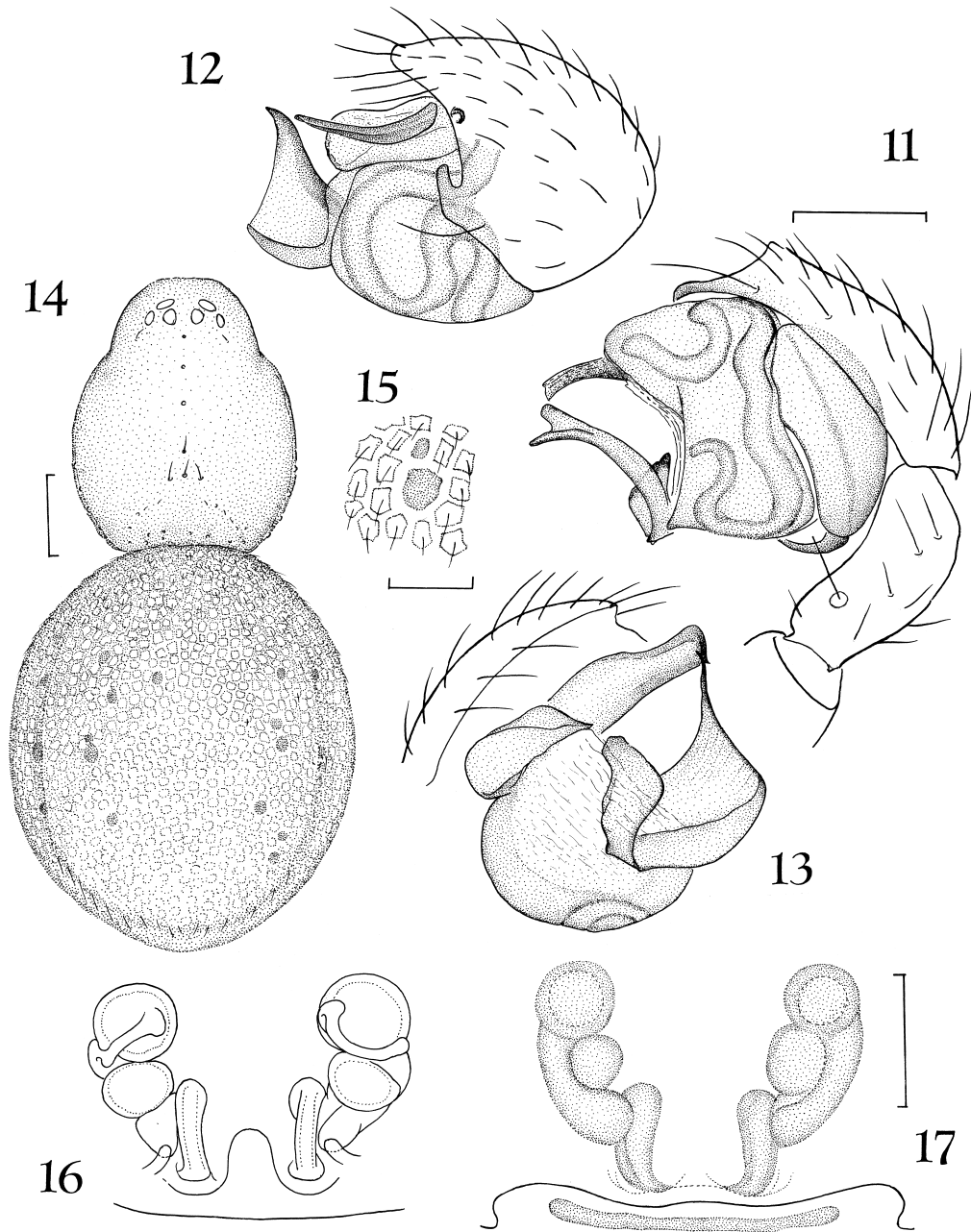
#### *Comaroma hatsushibai* sp. nov.

[Japanese name: Ôdai-yoroihimegumo]

(Figs. 11–17)

*Diagnosis.* Two species of the genus, *Comaroma maculosa* Oi, 1960 and *C. nakahirai* (Yaginuma, 1959) were hitherto known from Japan. However, the former species has recently been transferred from the original genus to *Balticoroma* Wunderlich, 2004, made for fossil spi-

ders in Baltic amber by Wunderlich (2004) mainly by the presence of a large retrodorsal outgrowth on the cymbium of male palp. The new species is readily distinguishable from *Balticoroma maculosa* with its larger size, arrangement of eyes and the shape of male and female genital organs. The cymbium of male palp of the new species has no swell but only a pit on the retrolateral edge other than paracymbium and that characteristic leads this to the genus *Comaroma* sensu Wunderlich (2004). The new species seems



Figs. 11–17. *Comaroma hatsushibai* Ono, sp. nov.: 11–13, male holotype (NSMT-Ar 5679), 14–17, female allotype (NSMT-Ar 5680). — 11, Male palp, retrolateral view; 12, male palpal organ, prolateral view; 13, male palpal organ, ventral view; 14, pro- and opisthosomata, dorsal view; 15, a part of the abdominal plate, dorsal view; 16, internal structure of female genitalia, dorsal view; 17, epigynum, ventral view. [Scales: Fig. 14, 0.2 mm; others, 0.1 mm.]

closer to *Comaroma simonii* Bertkau, 1889 from Europe in the basal structure of male and female genitalia, although the details of both are different from each other (cf. Figs. 11–13, 16–17 and Kropf, 1990, figs. 7–8, 12–14). *Comaroma nakahirai* is a peculiar eyeless spider only found from a cave in Shikoku [the record from Kyushu reported by Yaginuma (1985) should be based on a misidentification (T. Irie, pers. comm.)]. Although the male of the species is unknown, the general appearance of female is similar to that of the new species except for the absence of eyes.

*Type specimens.* Male holotype, female allotype and 1 male paratype from SW slope of Mt. Hidega-dake, Ōdaigahara-zan, 1560 m in elevation, Kamikitayama-mura, Yoshino-gun, Nara Prefecture, Honshu, Japan, 12–V–2004, from under rocks on the ground in a *Picea jezoensis* forest, S. Hatsushiba leg. (NSMT-Ar 5679–5681).

*Description.* Measurements are based on the male holotype and the female allotype. Female: Body length 1.63 mm; prosoma length 0.65 mm, width 0.53 mm; opisthosoma length 0.98 mm, width 0.86 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 1.47 mm (0.45+0.20+0.32+0.25+0.25), II 1.34 mm (0.38+0.18+0.31+0.22+0.25), III 1.14 mm (0.35+0.13+0.26+0.20+0.20), IV 1.47 mm (0.48+0.18+0.29+0.27+0.25). Male: Body length 1.55 mm; prosoma length 0.70 mm, width 0.60 mm; opisthosoma length 0.88 mm, width 0.73 mm; lengths of legs [total length (femur+patella+tibia+metatarsus+tarsus)]: I 1.88 mm (0.59+0.21+0.43+0.35+0.30), II 1.71 mm (0.52+0.21+0.41+0.28+0.29), III 1.50 mm (0.48+0.18+0.34+0.25+0.25), IV 1.92 mm (0.61+0.18+0.50+0.33+0.30).

Prosoma (Fig. 14). Carapace: longer than wide (length/width female 1.23, male 1.17), with short setae, median furrow absent, posterior declivity with some tubercles. Eyes: AME absent, ALE, PME and PLE almost same in size (ALE slightly larger than the others), PME-PME equal to PME-PLE, clypeus three times as wide as PME-PME. Reduction of anterior median eyes is also known

in European species, *Comaroma simonii* (Kropf, 1998). Chelicerae: with three teeth on the pro-margin of fang furrow and two or three small teeth on the retromargin, labium: wider than long (length/width 0.55 in female, 0.60 in male), sternum: as long as wide in female and male. Legs of the male relatively longer than those of the female, claws of the legs slender, with a few teeth.

Male palp (Figs. 11–13). Paracymbium and a pit present on retrodorsal part of cymbium, bulb with a thick embolus and a large conductor with spiniform tip.

Opisthosoma (Figs. 14–15): oval, longer than wide (length/width female 1.14, male 1.20), anterior surface with many tubercles, dorsally covered with a large sclerotized plate and many short hairs. The basal part of each hair scaled in female (Figs. 15). Anterior spinneret conical and much larger than the posterior one, colulus distinct with a pair of hairs.

Female genitalia (Figs. 16–17). Genital field situated on a wide, sclerotized plate, and internal structure visible through the plate. The canal between copulatory opening and spermatheca distinct and tubular, each spermatheca separated in two parts.

Coloration and markings. Female and male: carapace and opisthosomal plate shiny amber, without markings, chelicerae, maxillae, labium, sternum and all other appendages, dark yellow. Opisthosoma ventrally beige with yellowish brown genital plate.

*Distribution.* Known only from the type locality.

*Remark.* This species is dedicated to the collector of the type specimens, Mr. Shingo Hatsushiba, Tokyo.

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