

Descriptions of large- and medium-sized species of the genus *Cybaeus* (Araneae: Cybaeidae) from the Tohoku district, northern Honshu, Japan

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Abstract — The large- and medium-sized species of the genus *Cybaeus* are reported based on the specimens collected from the Tohoku district, northern Honshu, Japan. Four new species, *Cybaeus urabandai*, *C. yoshida*, *C. sasakii* and *C. miyagiensis*, and three known species, *C. nipponicus* (Uyemura 1938), *C. magnus* Yaginuma 1958, and *C. aquilonalis* Yaginuma 1958, are described. Males of *C. magnus* and females of *C. aquilonalis* are described for the first time. Four new species occur only in the Tohoku district. *Cybaeus magnus* and *C. aquilonalis* are also distributed in Hokkaido. *Cybaeus nipponicus* is distributed over a wide range, not only Honshu but also Shikoku and Kyushu.

Key words — Cybaeidae, *Cybaeus urabandai* n. sp., *Cybaeus yoshida* n. sp., *Cybaeus sasakii* n. sp., *Cybaeus miyagiensis* n. sp., description, Tohoku district

Spiders of the genus *Cybaeus* (Cybaeidae) are commonly found in woodlands in Japan from Hokkaido to Kyushu. They usually construct silken retreat beneath logs and stones on the forest floor with moderate moisture and do not move around much. Probably due to the tenacity to the particular forest patches, they show enormous geographical differentiation in their genitalia and a total of 53 species have so far been recorded from Japan. Furthermore, there are many undescribed species which await formal description. In spite of the great diversity in species number, the species assemblage in a particular area consists only of a few species differing in body size one another.

In this study, I describe and redescribe seven species of the genus, of which four are new, from the Tohoku district, northern Honshu, Japan (Fig. 1), which belong to the large- or medium-sized classes in the species assemblage in this area.

Materials and Methods

Morphological examination

All the measurements were made for the specimens immersed in 80% ethanol under a stereo dissecting microscope with an ocular micrometer. Female genitalia removed from the abdomen were cleared in hot 10% KOH and 3% H₂O₂ according to the method described in Komatsu & Yaginuma (1968) to observe internal sclerotized structure.

The type specimens designated in this paper and voucher specimens are deposited in the National Science Museum (Natural History), Tokyo. Other specimens are in my personal collection. Data of those specimens will be given by the following order: Locality, number of individuals, date collected, and name of the collector (HY = Hajime Yoshida,

KN = Koichi Nojima, TS = Tomoo Sasaki, YI = Yoh Ihara).

Abbreviations used in descriptions are as follows: ALE, anterior lateral eyes; AME, anterior median eyes; PLE, posterior lateral eyes; PME, posterior median eyes. Positions of the spines on legs refer as proposed by Komatsu (1968): VS, ventral spine; PLS, prolateral spine; RLS, retrolateral

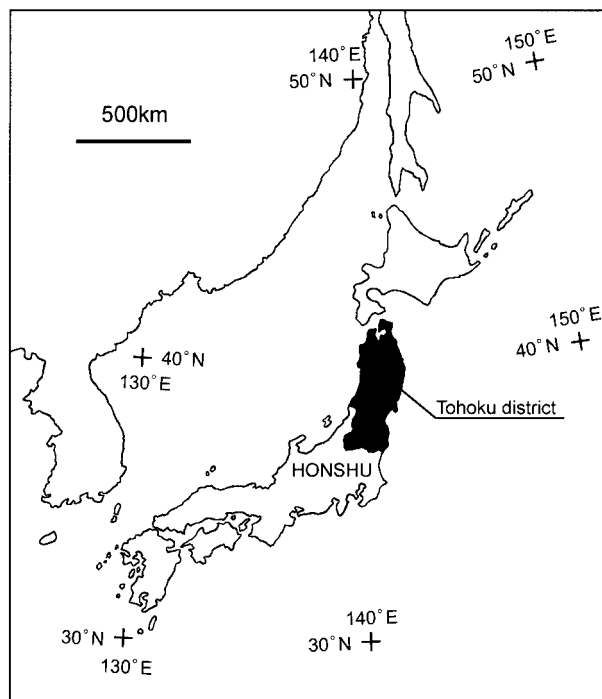


Fig. 1. Study area: the Tohoku district, northern Honshu, Japan.

spine.

Species recognition

Local species assemblages of the genus *Cybaeus* in the Tohoku district consist of several species, which are clearly separable by many morphological differences one another. They can be recognized as distinct biological species within each local species assemblage by their sympatry without any indication of hybridization. On the other hand, each species of the assemblage is either a geographical form of a single polytypic species or a component species of a single superspecies, separated by a morphological gap from other adjacent forms. I regarded two vicarious forms only allopatrically found as two distinct species, when degree of the morphological difference between the two species equals to or exceeds that exhibited by two sympatric species.

Diagnostic characters

Body size. The members of the genus *Cybaeus* varies enormously in body size. Body length was roughly classified into following three classes: small (2.5–5.0 mm), medium (5–10 mm), and large (10–20 mm) according to the criteria used by Roth (1993). Lengths of carapace and legs as body size of the species treated in this study are diverged as shown in Fig. 2.

Carapace (Figs. 3–4). Shape of the carapace is different among species or between sexes of the same species. The highest part of carapace is head or thoracic region. Head region is long and rather large in female, but relatively small

in male.

Chelicera (Fig. 4). Generally, chelicerae of the larger species are more strongly geniculate compared with the small one. Furthermore, female chelicerae are more strongly geniculate than those of males within the same species.

Male palp. Due to the similarity in external morphology, diagnosis of each species relies primarily upon genital morphology. Principal differences of male palp are in the proportions (relative lengths of cymbium and tibia), the shapes of patellar apophysis and apical part of conductor.

Female genitalia. Epigyna are simple, and resemble each other among species in appearance. However, they are distinguishable each other by internal structure. They are also distinguishable in the shape of genital opening or internal structure seen through the integument.

Length of legs. Relative length of legs to body varies between species (Fig. 2). Legs are longer in males than in females.

Distribution. Most species of Japanese *Cybaeus* have a very limited distributional range. Therefore, the data of collected locality is useful to identification of species.

Descriptions

Cybaeus nipponicus (Uyemura 1938)
[Japanese name: Kachidoki-namihagumo]
(Figs. 3E-F, 4C-D, 5A, C-D, 6A-C)

Bansaia nipponica Uyemura 1938, p. 128, figs. 1–5. (Female holotype from Shiba Park, Tokyo, Japan, collected by Haruo

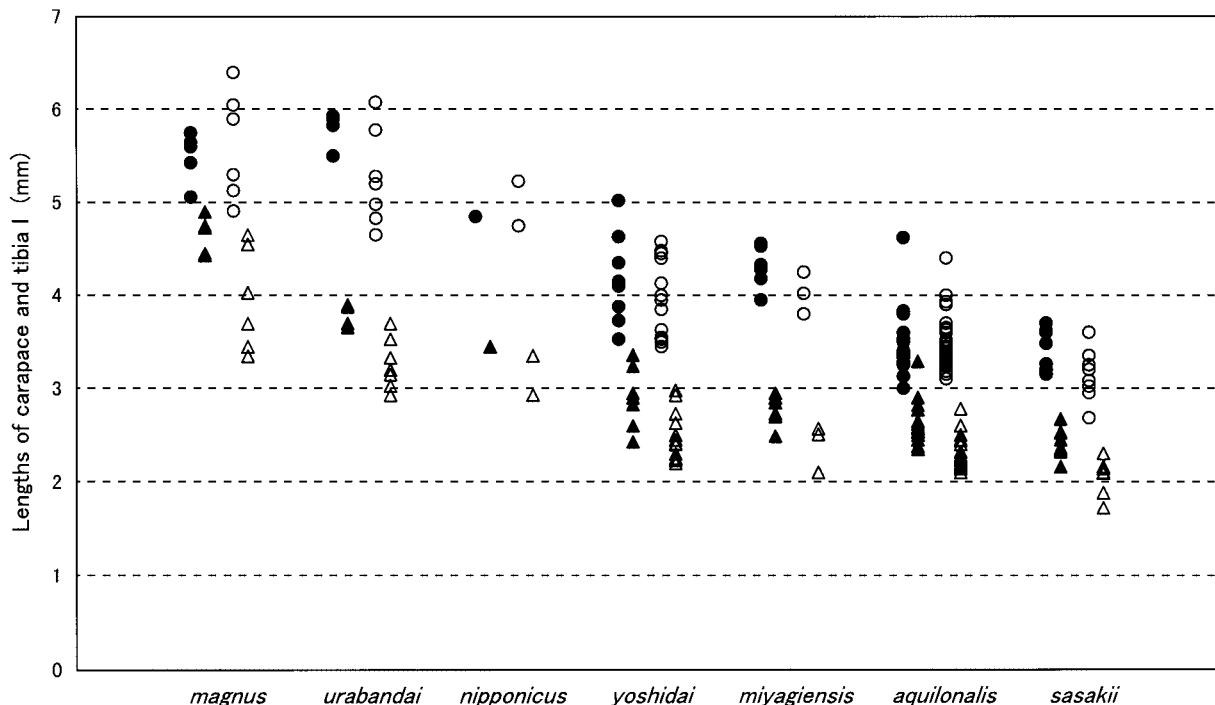


Fig. 2. Lengths of carapace (circles) and tibia of leg I (triangles) of seven species of *Cybaeus* in the Tohoku district. (solid: males, open: females)

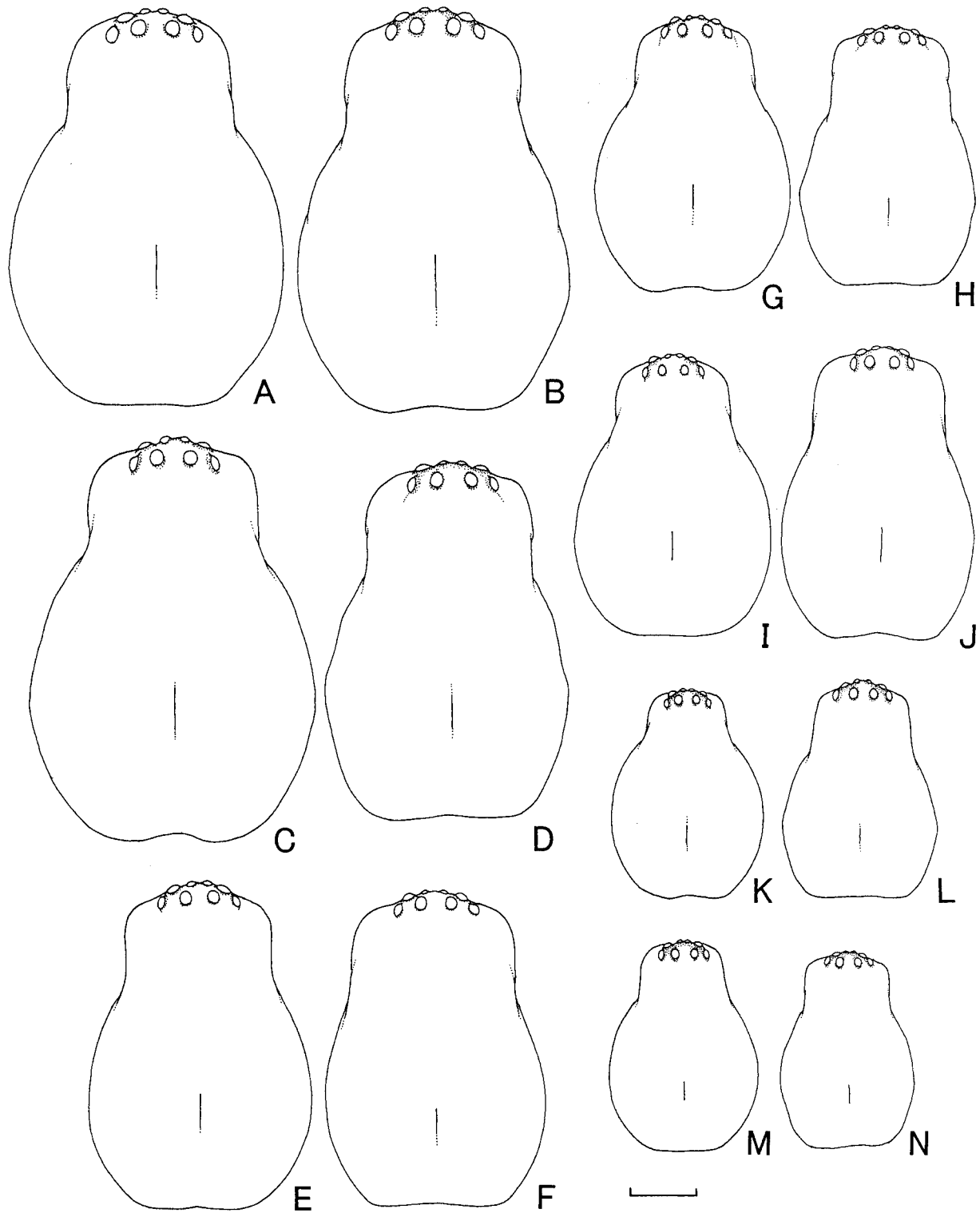


Fig. 3. Size and shape of carapace (dorsal view): A-B *Cybaeus magnus* (A male, Nishine-chô, Aomori Pref.; B female, Mt. Moriyoshi, Akita Pref.); C-D *C. urabandai* (C male, holotype; D female, paratype); E-F *C. nipponicus* (E male; F female, Yonezawa-shi, Yamagata Pref.); G-H *C. yoshidai* (G male, holotype; H female, paratype); I-J *C. miyagiensis* (I male, holotype; J female, paratype); K-L *C. aquilonalis* (K male; L female, Yonezawa-shi, Yamagata Pref.); M-N *C. sasakii* (M male, holotype; N female, paratype). (Scale: 1.0 mm)

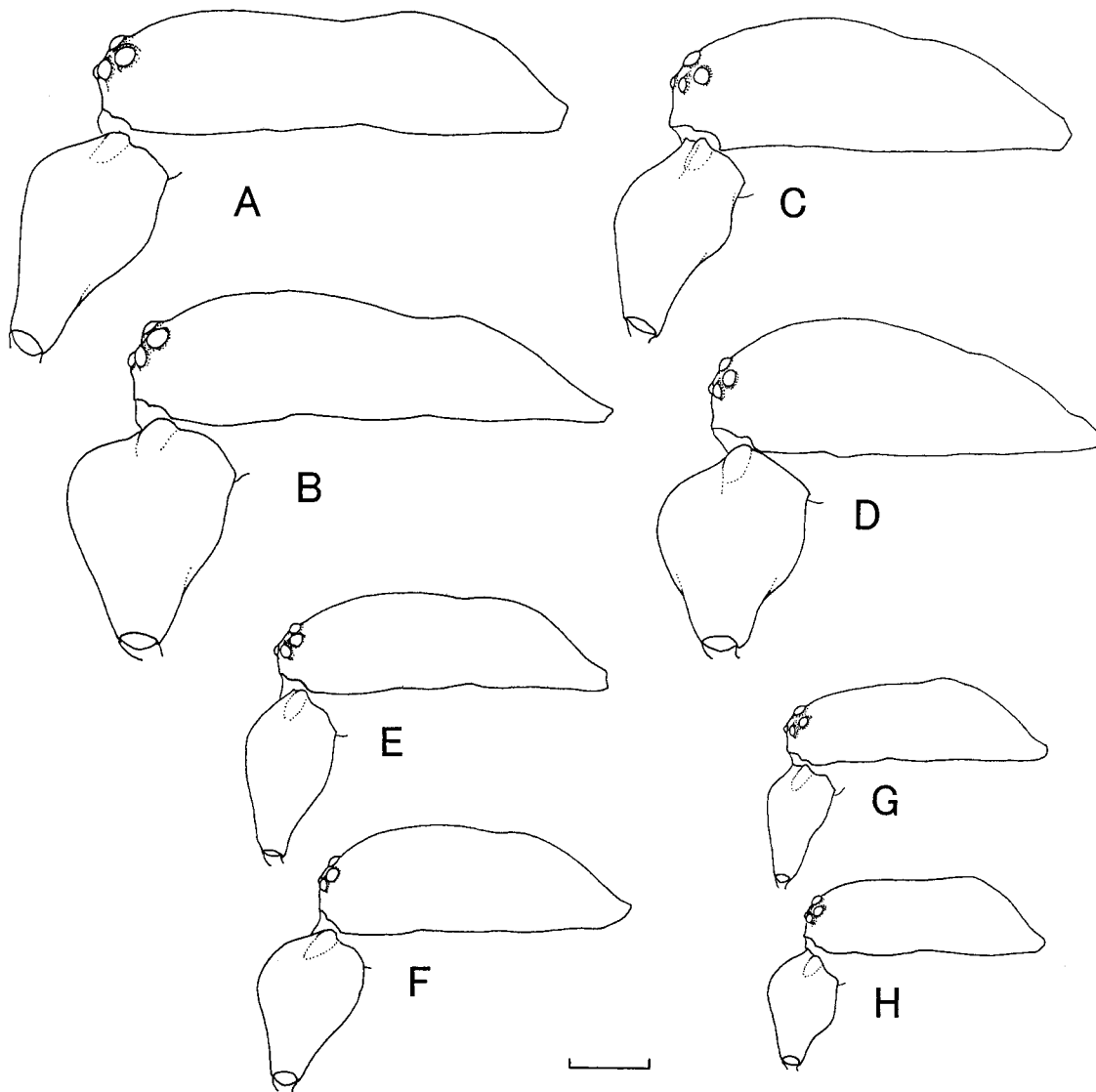


Fig. 4. Shape of carapace and chelicerae (lateral view). A-B *Cybaeus magnus* (A male, Nishine-chô, Aomori Pref.; B female, Mt. Moriyoshi, Akita Pref.); C-D *C. nipponicus* (C male; D female, Yonezawa-shi, Yamagata Pref.); E-F *C. yoshidai* (E male, holotype; F female, paratype); G-H *C. sasakii* (G male, holotype; H female, paratype). (Scale: 1.0 mm)

Fukazawa, detailed collection date unknown, though the date is in November 1936, not examined, missing.)

Cybaeus nipponicus: Yaginuma 1986, p. 143, pl. 40 (fig. 8), fig. 78 (2); Chikuni 1989, p. 104, fig. 26.

Specimens examined. YAMAGATA PREF. Yonezawa-shi, Seki, Shirabu Spa: 1♂, 28-VIII-1995, KN; 1♀, 28-VIII-1995, YI. Mogami-gun, Mogami-machi, Mt. Okina, 1♂, 20-IX-1987, HY. FUKUSHIMA PREF. Minami-aizu-gun, Tateiwa-mura, 1♀, 30-IX-1975, F. Komai.

Variation. Body size, coloration, shape of male palp, and internal structure of female genitalia considerably vary among geographic populations of this species (Ihara unpublished data). Specimens from the Tohoku district (Yamagata and Fukushima Prefectures) do not almost have a difference compared with that of the Kanto district

including of type locality.

Distribution. Yamagata Prefecture and Fukushima Prefecture in the Tohoku district (Fig. 7). This species has a most widespread distributional range among Japanese species of the genus *Cybaeus*. The range covers Honshu, Shikoku, and Kyushu, Japan (Yaginuma 1986 and Chikuni 1989). Present specimens from Yamagata Prefecture is the northernmost record of the species.

Remarks. *Cybaeus nipponicus* resembles *C. magnus* in the shape of male palp and epigynum. However, the two species can be distinguished in body size (body length ca. 8–10 mm in *C. nipponicus* whereas ca. 10–15 mm in *C. magnus*), shape of carapace (large and rise head in *C. nipponicus* vs small and flat head in *C. magnus*) and genital morphology.

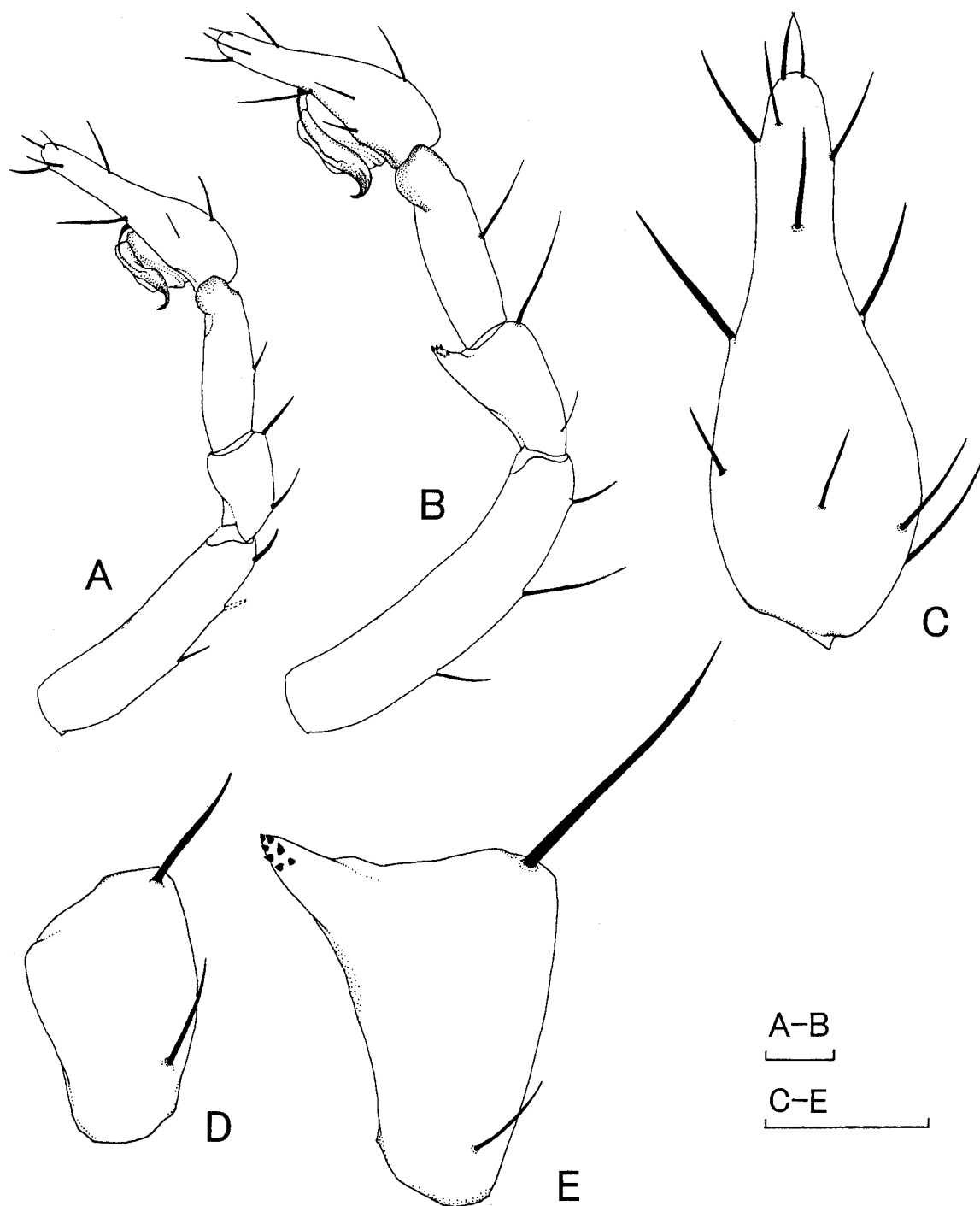


Fig. 5. Male left palp of *Cybaeus nipponicus* and *C. magnus*: A, C-D *C. nipponicus* (Yonezawa-shi, Yamagata Pref.); B, E *C. magnus* (Nishine-chô, Aomori Pref.)—A-B retrolateral view; C cymbium, dorsal view; D-E patella, dorsolateral view. (Scale: 0.5 mm)

Cybaeus magnus Yaginuma 1958
 [Japanese name: Ô-namihagumo]
 (Figs. 3A-B, 4A-B, 5B, E, 8A-C)

Cybaeus magnus Yaginuma 1958, p. 76, figs 28–31 (female holotype from Osorezan, Aomori Prefecture, 16-VIII-1957; a

female paratype from Hiyamizu Pass, Aomori Prefecture, 17-VIII-1957, preserved in Ohtemon Gakuin University, examined); Yaginuma 1986, p. 143, pl. 40 (fig. 9), fig. 78 (14).

This species was originally described from Shimokita Peninsula, Aomori Prefecture, northernmost Honshu by only two female specimens. Here I present description of

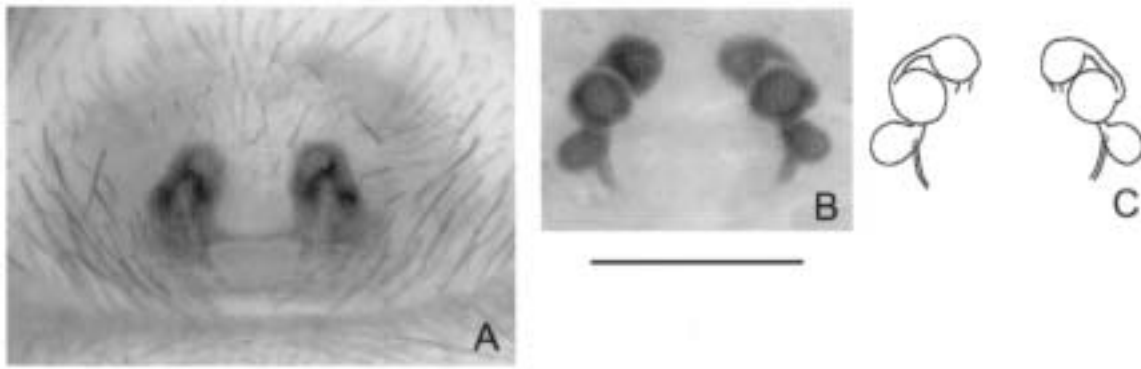


Fig. 6. Female genitalia of *Cybaeus nipponicus*: A Yonezawa-shi, Yamagata Pref.; B-C Tateiwa-mura, Fukushima Pref.—A epigynum, ventral view; B internal structure, dorsal view; C connection of spermathecae and ducts, dorsal view. (Scale: 0.5 mm)

male of this species on the basis of a specimen newly collected.

Description. Male (voucher specimen). Measurements (in mm). Body length 10.80; carapace length 5.75, width 4.05, head region width 2.38; abdomen length 5.25, width 3.43; sternum length 2.66, width 2.26; labium length 0.73, width 0.86. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total): Leg I: 5.00/ 1.90/ 4.75/ 5.03/ 3.40; 20.08. Leg II: 4.75/ 1.90/ 4.25/ 4.90/ 3.23; 19.03. Leg III: 4.30/ 1.75/ 3.38/ 4.55/ 2.63; 16.60. Leg IV: 4.95/ 1.75/ 4.43/ 5.65/ 2.90; 19.68.

Head region narrow, and as high as thoracic region (Figs. 3A, 4A). Anterior eye row almost straight as seen from front, posterior eye row slightly recurved as seen from above. Diameters of eyes: AME < ALE = PME < PLE; AME a half to ALE. Ocular area wider than long, 2.1: 1 in ratio. Clypeus shorter than median ocular area, 1: 1.4 in ratio. Chelicera geniculate (Fig. 4A), promargin of fung furrow with 3 teeth (median one the largest), retromargin with 4 teeth and several denticles, and basally with lateral condyle. Legs long, leg I slightly longer than leg IV. Length of legs: 1>4>2>3. Tibia I with 2-2-2-2 VS and 2 (left) or 3 (right) PLS and 3 RLS; metatarsus I with 2-2-3 VS, 4 PLS and 3 RLS; tibia II with 2-2-1(retromargin)-2 VS and 4 PLS and 2 RLS; metatarsus II 2-2-3 VS, 4 PLS and 3 RLS.

Palp (Fig. 5B, E). Relatively slender and long in proportion. Patellal apophysis oblique circular cone with 7 (left) or 10 (right) conical teeth. Tibia longer than patella, 1.25: 1 in ratio. Genital bulb oval, conductor simple.

Coloration. Carapace reddish brown with reticulate dark grayish markings on the sides of the head and radial bands on the thorax. Chelicerae, maxillae and labium dark reddish brown; chelicerae darker than the others. Sternum reddish brown. Legs reddish brown dorsally with faint grayish annulations. Abdomen dark gray, dorsally with dull yellow cardiac and chevron pattern.

Specimens examined. Voucher specimen. Terada, Nishinechô, Iwate-gun, Iwate Prefecture, Japan: 1♂, 10-VIII-1998, T. Sasaki leg.

Other specimens. AOMORI PREF. Aomori-shi, Komagome, 1♀, 4-X-1996, TS. Kamikita-gun, Shichinohe-machi, southwest area of the Wada dam, 1♂, 11-VIII-1998, TS. IWATE PREF. Kamaishi-shi, Komagi-chô, 1♀, 21-X-1997, TS. Iwate-gun, Shizukuishi-chô, Kakkonda, 1♂1♀, 9-VIII-1996, TS. AKITA PREF. Mt. Moriyoshi, 2♀, 21-VIII-1979, R. Sonobe. YAMAGATA PREF. Obanazawa-shi, Mt. Okina-san, 1♂, 10-X-1986, HY. Higashitagawa-gun, Asahi-mura, Tamugimata: 1♀, 28-VIII-2003, TS.

Variation. No prominent variation was found in the mor-

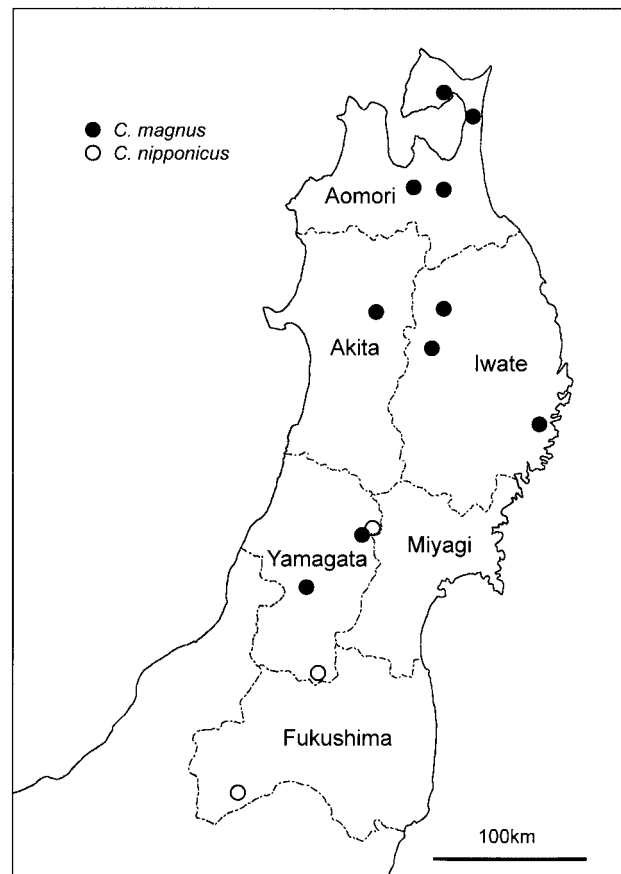


Fig. 7. Distributions of *Cybaeus nipponicus* and *C. magnus* in northern Honshu.

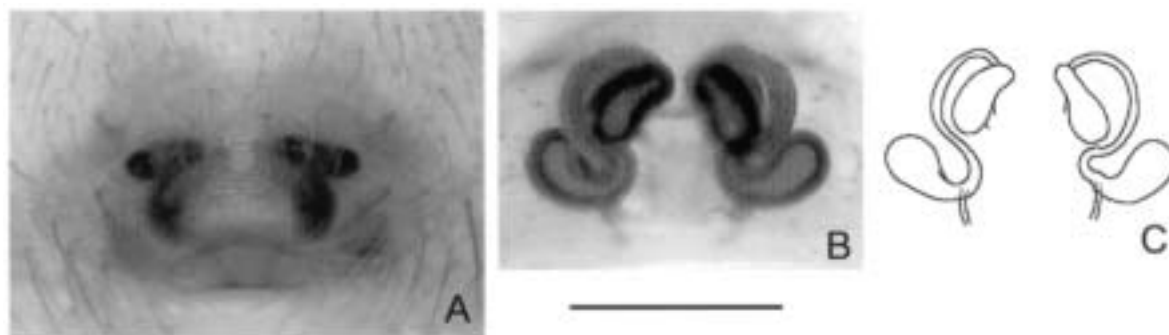


Fig. 8. Female genitalia of *Cybaeus magnus* (Mt. Moriyoshi, Akita Pref.): A epigynum, ventral view; B internal structure, dorsal view; C connection of spermathecae and ducts, dorsal view. (Scale: 0.5 mm)

phology of male palp and female genitalia both within and among local populations in the Tohoku district.

Range of body size (in mm, means in parentheses; male $n=5$, female $n=6$): Carapace length, 5.06-5.75 (5.50) in male, 4.91-6.40 (5.62) in female; carapace width, 3.55-4.05 (3.90) in male, 3.45-4.55 (3.94) in female.

Distribution. Northern Honshu (Aomori, Iwate, Akita, and Yamagata Prefectures (Fig. 7) and Hokkaido (Matsuda et al. 2004), Japan. Present specimens collected from Yamagata Prefecture are the southernmost record of the species.

Remarks. *Cybaeus magnus* is one of the largest species of the genus in Japan.

In the original description by Yaginuma (1958), type specimens of the species are allegedly deposited in the Osaka Municipal Museum of Natural History, Osaka. However, actually, they have been preserved in the biological

laboratory of Ohtemon Gakuin University, Osaka. They are supposed to be transferred in the Osaka Municipal Museum of Natural History, eventually, together with the holotype of the following species, *C. aquilonalis*.

Cybaeus aquilonalis Yaginuma 1958
[Japanese name: Ko-namihagumo]
(Figs. 3K-L, 9A-C, 10A-C)

Cybaeus aquilonalis Yaginuma 1958, p. 76, fig. 27 (male holotype from Hiyamizu Pass, Aomori prefecture, 17-VIII-1957, preserved in the laboratory of biology, Ohtemon Gakuin University, examined); Yaginuma 1986, p. 143, fig. 78 (11).

This species was originally described from Shimokita Peninsula, Aomori Prefecture, northernmost Honshu, by

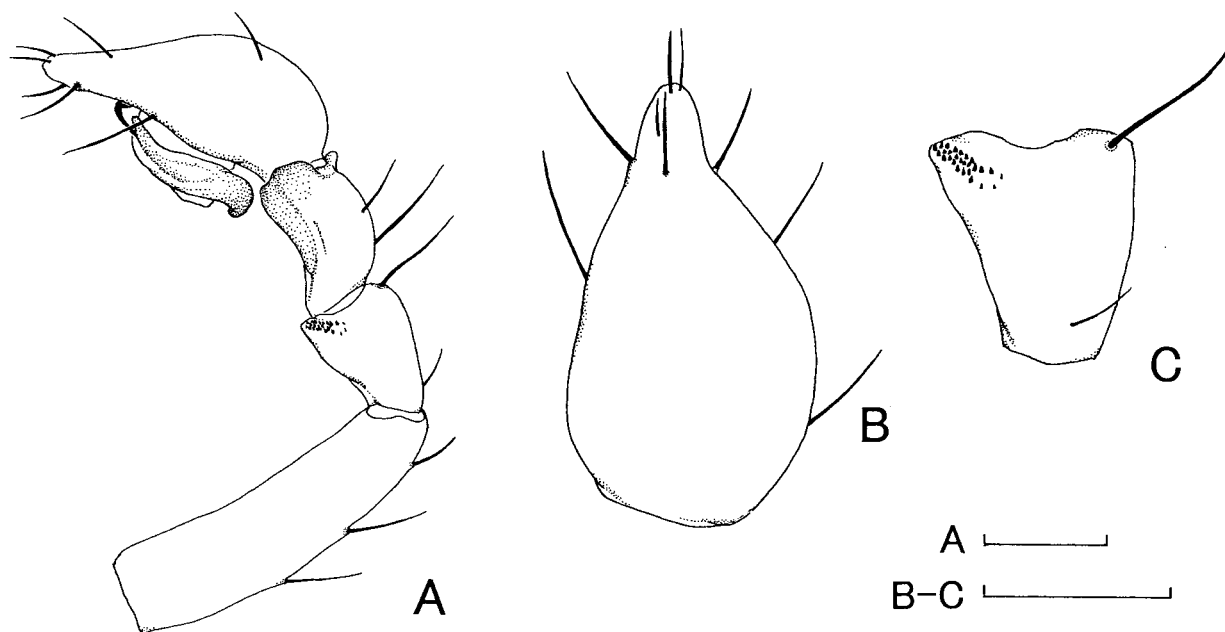


Fig. 9. Male left palp of *Cybaeus aquilonalis* (Yonezawa-shi, Yamagata Pref.): A retrolateral view; B cymbium, dorsal view; C patella, dorsolateral view. (Scale: 0.5 mm)

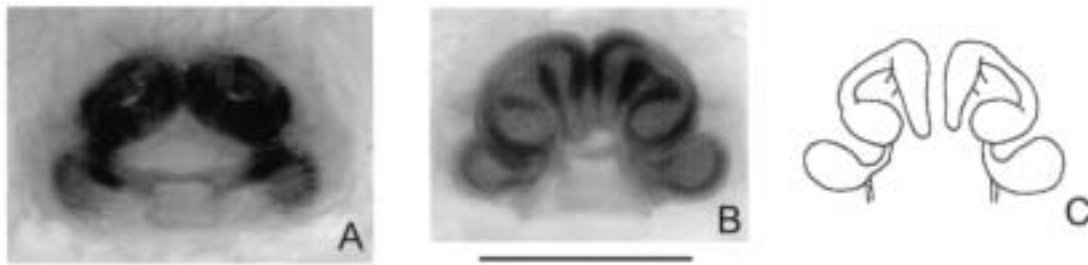


Fig. 10. Female genitalia of *Cybaeus aquilonalis* (Yonezawa-shi, Yamagata Pref.): A epigynum, ventral view; B internal structure, dorsal view; C connection of spermathecae and ducts, dorsal view. (Scale: 0.5 mm)

only three male specimens. Here I present description of female on the basis of a specimen newly collected.

Description. Female (voucher specimen). Measurements (in mm). Body length 7.30; carapace length 3.15, width 2.21, head region width 1.36; abdomen length 4.30, width 3.25; sternum length 1.50, width 1.33; labium length 0.40, width 0.52. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total): Leg I: 2.44/ 0.99/ 2.10/ 1.86/ 1.02; 8.41. Leg II: 2.34/ 0.98/ 1.85/ 1.80/ 1.08; 8.05. Leg III: 1.94/ 0.70/ 1.50/ 1.77/ 0.83; 6.74. Leg IV: 2.46/ 0.90/ 2.10/ 2.50/ 1.15; 9.11.

Head region narrow, ratio of width to thoracic region 0.62 (Fig. 3L). Thoracic region higher than head region. Anterior eye row straight as seen from front, posterior eye row straight as seen from above. Diameters of eyes: AME < PLE = PME < ALE; AME two thirds to ALE. Ocular area wider than long, 2.1: 1 in ratio. Clypeus shorter than median ocular area, 1: 1.7 in ratio. Chelicerae geniculate, promargin of fung furrow with 3 teeth (median one the largest), retromargin with 4 teeth and 4 denticles, and basally with lateral condyle. Legs rather long, length of legs: 4>1>2>3. Tibia I with 2-2-2-2 VS and 2 PLS and 2 RLS; metatarsus I with 2-2-3 VS, 3 PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS and 4 PLS and 2 RLS; metatarsus II 2-2-3 VS, 4 PLS and 2 RLS.

Genitalia (Fig. 10A-C). Epigynum simple, posteriorly with small opening, and anteriorly internal structure conspicuous through the integument.

Coloration. Carapace bright yellowish brown with reticulate faint grayish markings. Chelicerae, maxillae and labium bright brown; chelicerae darker than the others. Sternum bright yellowish brown. Legs, basally bright yellowish brown with dull yellowish brown annulations, anteriorly dull yellowish brown. Abdomen grayish yellow spots pattern light yellow on background.

Specimens examined. Voucher specimen. Seki, Yonezawa-shi, Yamagata Prefecture, Japan: 1♀, 27-VIII-1995, Y. Ihara leg.

Other specimens. HOKKAIDO Sapporo-shi: Maruyama, 1♂, 19-IX-1996, Nobuo Tsurusaki; Atsubetsu-ku, 2♂2♀, 30-VIII-1999, Osamu Watanabe et al. Hakodate-shi: Mt. Hakodate, 3♀, 8-IX-1995, N. Tsurusaki. AOMORI PREF. Aomori-shi, Takisawa, 1♀, 2-X-1997, TS. Nakatsugaru-gun, Nishimeyamura, Kawaratai, 1♂, 15-VII-1998. IWATE PREF. Morioka-shi: Hakogamori, 1♂, 18-VIII-1992, TS; Asagishi, Ôshida, 1♀, 28-

IX-1995, TS, 1♀, 29-IX-1995, TS; Kamiyonai, 29-IX-1995, 1♀, TS. Ichinoseki-shi, Genbi-chô, 1♀, 31-VIII-1994, TS. Kamaishi-shi, Ôdaira-chô, 1♂, 23-X-1997, TS. Iwate-gun, Nishine-chô, Terada, 1♂, 10-VIII-1998, TS. YAMAGATA PREF. Same locality as the voucher specimens: 1♂4♀, 28-VIII-1995, YI; 2♂6♀, 28-VIII-1995, KN. Yonezawa-shi, Shirabu Pass, 2♀, 28-VIII-1995, KN. Obanzawa-shi, Mt. Goshô-zan, 8♂8♀, 17-VIII-1986, HY. ISHIKAWA PREF. Ishikawa-gun, Yoshinodani-mura, Hakusan toll road, 2♂4♀, 22-VIII-1994, YI.

Variation. No prominent variation was found in the morphology of male palp and female genitalia both within and among local populations in Honshu.

Range of body size (in mm, means \pm SD in parentheses; male n=15, female n=26): Carapace length, 3.00-4.62 (3.50

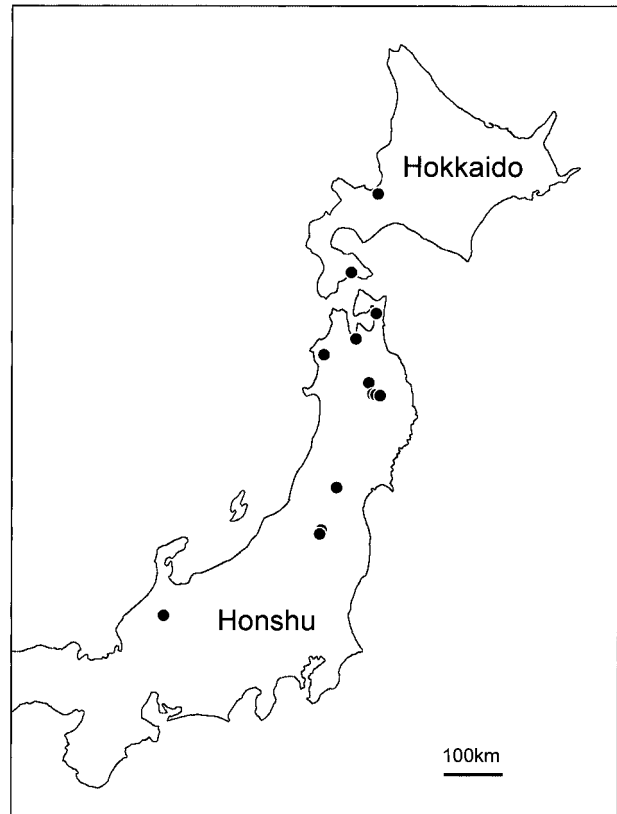


Fig. 11. Distribution of *Cybaeus aquilonalis* in Honshu and Hokkaido.

± 0.381) in male, 3.10-4.40 (3.48 ± 0.307) in female; carapace width, 2.30-3.16 (2.57 ± 0.208) in male, 2.21-3.00 (2.48 ± 0.194) in female.

Distribution. Northern Honshu (Aomori, Iwate, Yamagata, and Ishikawa Prefectures) and Hokkaido, Japan. This species has a relatively broad range of distribution, extending from Hokkaido to central Honshu (Fig. 11).

Remarks. *Cybaeus aquilonalis* most resembles *C. aokii* Yaginuma 1972, not only in external morphology but also in the fundamental structure of male palp and female genitalia. Therefore, these two species are considered to be closely related. *C. aokii* is distributed in Hokkaido alone.

In the original description by Yaginuma (1958), holotype of the species is allegedly deposited in the Osaka Municipal Museum of Natural History, Osaka. However, actually, it has been preserved in the collection in the biological laboratory of, Ohtemon Gakuin University, Osaka.

***Cybaeus urabandai* n. sp.**

[Japanese name: Urabandai-namihagumo]
(Figs. 3C-D, 12A, D-E, J, L, 13A-C)

Description. Male (holotype). Measurements (in mm). Body length 11.10; carapace length 5.90, width 4.20, head region width 2.50; abdomen length 5.65, width 3.65; sternum length 2.72, width 2.28; labium length 0.74, width 0.80. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total): Leg I: 4.30/ 1.83/ 3.90/ 3.85/ 2.53; 16.41. Leg II: 4.25/ 1.90/ 3.53/ 3.70/ 2.28; 15.66. Leg III: 3.85/ 1.65/ 2.85/ 3.60/ 2.00; 13.95. Leg IV: 4.35/ 1.75/ 3.78/ 4.58/ 2.28; 16.74.

Head region as high as thoracic region. Anterior eye row slightly recurved as seen from front, posterior eye row almost straight as seen from above. Diameters of eyes: AME < PLE = PME < ALE; AME two thirds to ALE. Ocular area wider than long, 2.2: 1 in ratio. Clypeus shorter than median ocular area, 1: 1.4 in ratio. Chelicera geniculate, promargin of fung furrow with 3 teeth (median one the largest), retromargin with 4 teeth and several denticles, and basally with lateral condyle. Legs relatively short, length of legs: 4>1>2>3. Tibia I with 2-2-2-2 VS and 2 PLS and 2 RLS; metatarsus I with 2-2-3 VS, 3 PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS and 4 PLS and 2 RLS; metatarsus II 2-2-3 VS, 4 PLS and 2 RLS.

Palp (Fig. 12A, D-E, J, L). Relatively thick and short in proportion. Patella with an apophysis dorsally with many conical teeth. Tibia shorter than patella, 1: 1.2 in ratio. Genital bulb circle, conductor simple without projection.

Coloration. Carapace reddish brown with reticulate dark grayish markings on the sides of the head and radial bands on the thorax. Chelicerae, maxillae and labium dark reddish brown; chelicerae darker than the others. Sternum reddish brown. Legs reddish brown ventrally with faint grayish annulations. Abdomen, dorsally brownish black with dull yellow cardiac and chevron pattern, ventrally dull yellowish brown.

Female. Measurements (in mm; paratype). Body length 11.50; carapace length 4.98, width 3.50, head region width 2.30; abdomen length 6.88, width 4.70; sternum length 2.38, width 2.01; labium length 0.70, width 0.80. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total) as follows. Leg I: 3.45/ 1.58/ 3.20/ 2.90/ 1.68; 12.81. Leg II: 3.50/ 1.55/ 2.83/ 2.80/ 1.63; 12.31. Leg III: 3.10/ 1.45/ 2.20/ 2.73/ 1.35; 10.83. Leg IV: 3.75/ 1.45/ 3.10/ 3.55/ 1.70; 13.55. Tibia I with 2-2-2-2 VS and 2 PLS; metatarsus I with 2-2-3 VS, 1 PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS and 3 PLS; metatarsus II 2-2-3 VS, 3 PLS and 1 RLS.

Similar to male in coloration. Carapace more slender, head region longer and rather larger (Fig. 3, cf. D with C). Chelicera strongly geniculate. Abdomen larger and more rounded, legs shorter than those of male.

Genitalia (Fig. 13A-C). Epigynum simple, posteriorly with opening. Annular copulatory ducts clear, seen anterior of the opening through the integument.

Variation. No prominent variation was found in the morphology among the populations, probably due partly to its narrow range of distribution.

Range of body size (in mm, means in parentheses; male $n=4$, female $n=7$): Carapace length, 5.50-5.93 (5.57) in male, 4.65-6.08 (5.26) in female; carapace width, 4.00-4.35 (4.19) in male, 3.08-4.30 (3.62) in female.

Specimens examined. Type series. Urabandai Plateau, Kitasiobara-mura, Yama-gun, Fukushima Prefecture, Japan: holotype (σ); paratype (σ), 27-VIII-1995, Y. Ihara leg.

Other specimens. FUKUSHIMA PREF. Same locality as the type series, 1 σ 1 σ , 27-VIII-1995, KN. YAMAGATA PREF. Yonezawa-shi: Sirabu Pass 3 σ , 28-VIII-1995, KN; Seki, Shirabu Spa, 1 σ 1 σ , 28-VIII-1995, YI. Higashitagawa-gun, Asahi-mura, Tamugimata: 1 σ , 28-VII-2003, TS; 1 σ , 1-X-2003, TS.

Distribution. Fukushima and Yamagata Prefectures, northern Honshu, Japan (Fig. 14).

This species is distributed in a restricted area covering southern part of the Tohoku district.

Remarks. In the Urabandai Plateau and adjoining Yonezawa-shi, the local species assemblage of the genus *Cybaeus* consists of at least five species: *C. urabandai*, *C. nipponicus*, *C. yoshidai*, *C. aquilonalis*, and *C. sasakii*. They are diverged in body size as shown Fig. 16. *Cybaeus urabandai* is the largest species among them.

Cybaeus urabandai resembles *C. magnus* in body size (Fig. 2) and coloration. However, this species can be distinguished from *C. magnus* by the shorter legs and genital morphology. Furthermore, their distributions seem to be separated into south and north areas in the Tohoku district, respectively (Figs. 7 and 14).

***Cybaeus yoshidai* n. sp.**

[Japanese name: Yamagata-namihagumo]
(Figs. 3G-H, 4E-F, 12B-C, F-I, K, M, 16A-D)

Description. Male (holotype). Measurements (in mm). Body length 7.50; carapace length 4.15, width 2.98, head

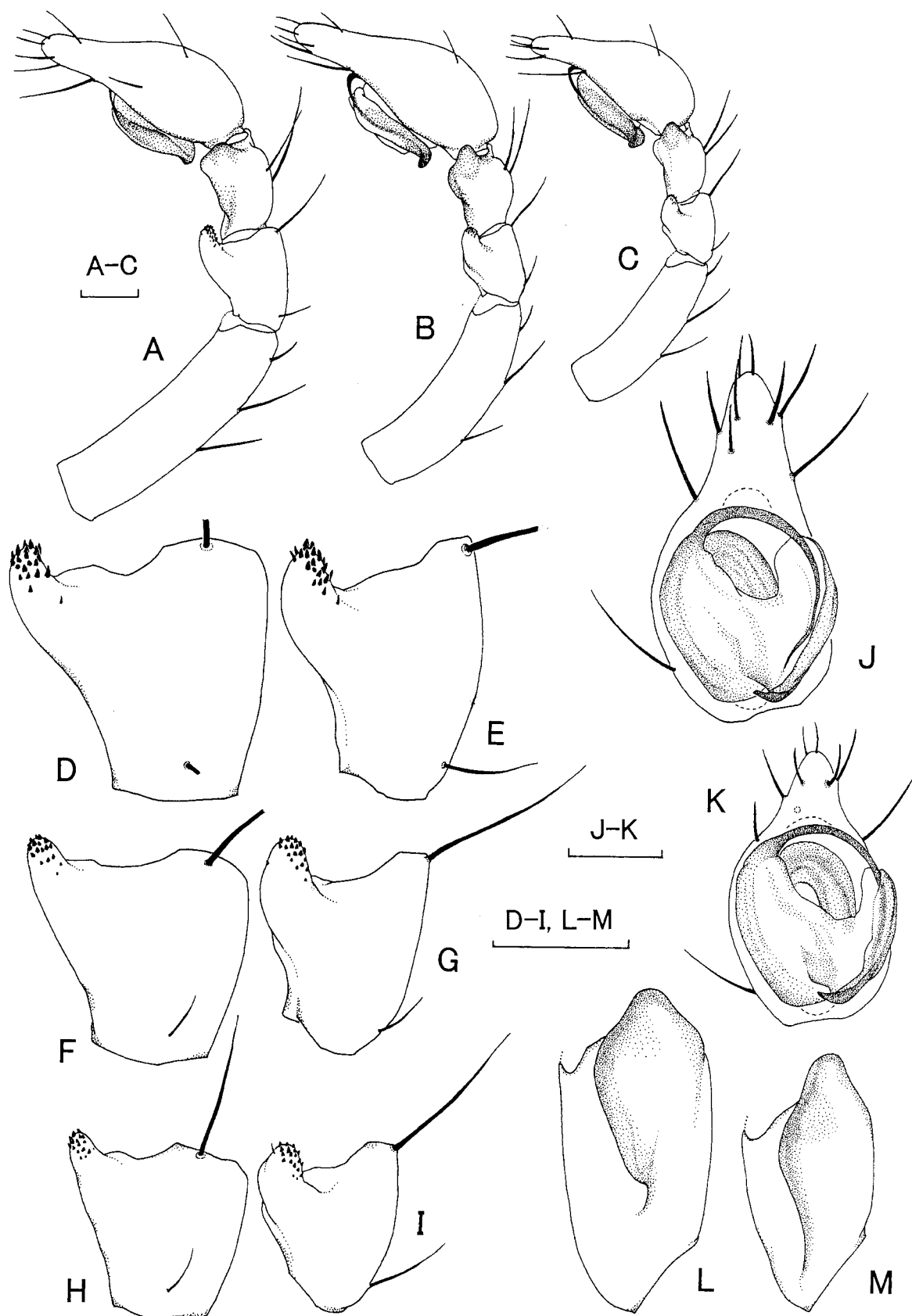


Fig. 12. Male left palp of *Cybaeus urabandai* n. sp. and *C. yoshidai* n. sp.: A, D-E, J, L *C. urabandai* (holotype); B, F-G *C. yoshidai* (Iwadeyama-machi, Miyagi Prefecture); C, H-I, K, M *C. yoshidai* (holotype)—A-C retrolateral view; D, F, H patella, dorsolateral view; E, G, I patella, lateral view; J-K genital bulb, ventral view; L-M tibia, ventrolateral view. (Scale: 0.5 mm)

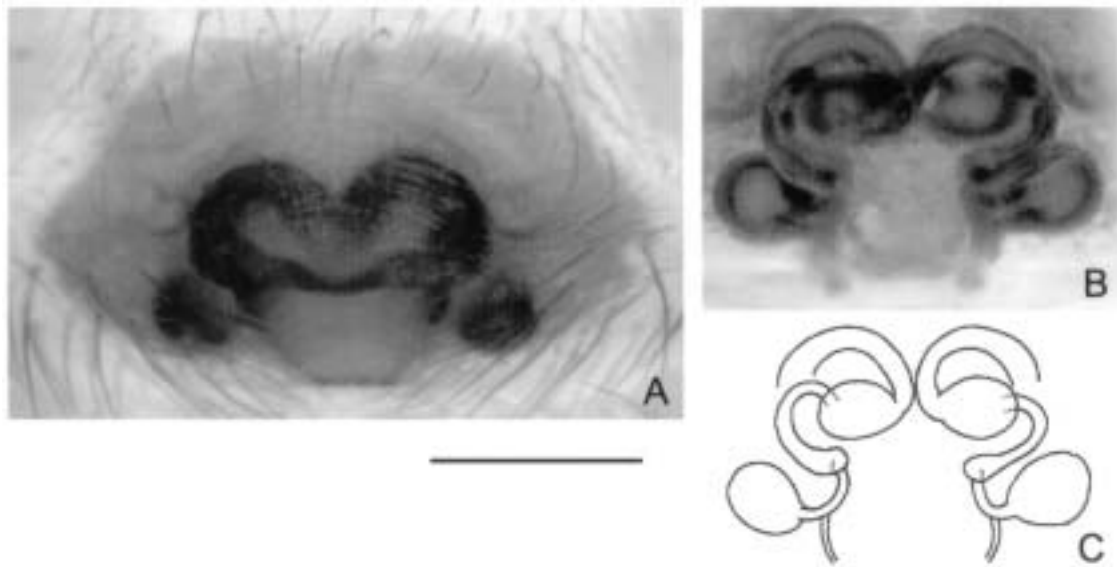


Fig. 13. Female genitalia of *Cybaeus urabandai* n. sp. (paratype): A epigynum, ventral view; B internal structure, dorsal view; C connection of spermathecae and ducts, dorsal view. (Scale: 0.5 mm)

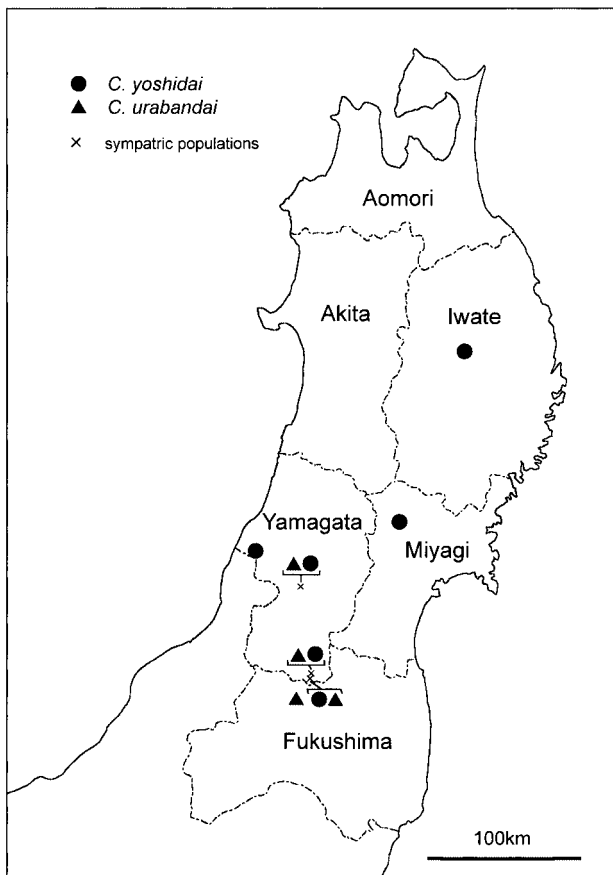


Fig. 14. Distributions of *Cybaeus urabandai* n. sp. and *C. yoshidai* n. sp. in northern Honshu.

region width 1.76; abdomen length 3.65, width 2.30; sternum length 1.88, width 1.67; labium length 0.56, width 0.56. Length of legs (femur/ patella/ tibia/ metatarsus/

tarsus; total): Leg I: 3.08/1.34/2.90/2.80/1.81; 11.93. Leg II: 3.05/ 1.26/ 2.60/ 2.68/ 1.68; 11.27. Leg III: 2.95/ 1.18/ 2.09/ 2.60/ 1.44; 10.26. Leg IV: 3.36/ 1.24/ 2.85/ 3.23/ 1.71; 12.39.

Head region as high as thoracic region (Fig. 4E). Anterior eye row straight as seen from front, posterior eye row slightly procurved as seen from above. Diameters of eyes: AME < PME = PLE < ALE; AME half to ALE. Ocular area wider than long, 2: 1 in ratio. Clypeus shorter than median ocular area, 1: 1.5 in ratio. Chelicera geniculate (Fig. 4E), promargin of fang furrow with 3 teeth (median one the largest), retromargin with 5 teeth and 3 denticles, and basally with lateral condyle. Length of legs: 4>1>2>3. Tibia I with 2-2-2-2 VS and 1 (left) or 2(right) PLS; metatarsus I with 2-2-2 VS, 1 PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS and 4 (left) or 3 (right) PLS; metatarsus II 2-2-3 VS, 3 PLS and 1 RLS.

Palp (Fig. 12C, H-I, K, M). Relatively thick and short in proportion. Cymbium short and wide. Patella with an apophysis dorsally with many conical teeth. Tibia shorter than patella, 0.9: 1 in ratio. Genital bulb relatively large, conductor simple without projection.

Coloration. Carapace head region bright brown, thoracic region bright yellowish brown. Chelicerae and maxillae reddish brown, labium and sternum bright brown. Legs bright yellowish brown with dull yellowish brown annulations. Abdomen, dorsally olive brown with bright yellowish brown cardiac and chevron pattern, ventrally dull yellow.

Female. Measurements (in mm; one of the paratypes). Body length 7.55; carapace length 3.85, width 2.60, head region width 1.75; abdomen length 3.65, width 2.80; sternum length 1.78, width 1.57; labium length 0.60, width 0.60. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus;

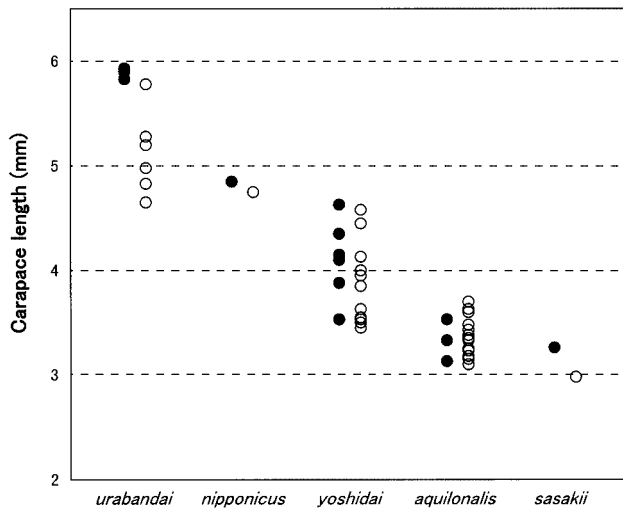


Fig. 15. Interspecific difference in carapace length among five species of the *Cybaeus* assemblage in the area of Urabandai Plateau and Yonezawa-shi, Tohoku District, northern Honshu. (Solid circles: male, open circles: female)

total) as follows. Leg I: 2.78/ 1.22/ 2.45/ 2.26/ 1.38; 10.09. Leg II: 2.60/ 1.24/ 2.22/ 2.20/ 1.28; 9.54. Leg III: 2.38/ 1.10/ 1.85/ 2.17/ 1.10; 8.61. Leg IV: 3.00/ 1.19/ 2.56/ 2.98/ 1.42; 11.15. Tibia I with 2-2-2 VS and 2 PLS; metatarsus I with 2-2-2 VS, 1 PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS and 3 (left) or 2 (right) PLS; metatarsus II 2-2-3 VS, 4 PLS and 1 RLS.

Similar to male in coloration. Carapace more slender, head region longer and rather larger (cf. Figs. 3H and 4F with 3G and 4E). Chelicerae more geniculate (Fig. 4, cf. F with E). Abdomen larger and more rounded, legs shorter

than those of male.

Genitalia (Fig. 16A-D). Epigynum simple, medially with relatively large opening. Copulatory ducts large and bent J-shaped. Spermathecae, conspicuous through the integument at both sides of the opening, round.

Variation. A male specimen from Miyagi Prefecture had a distinctly larger palp compared with other specimens collected from Yamagata Prefecture (Fig. 12. cf. B, F-G with C, H-I). This might suggest that *Cybaeus yoshidai* becomes larger in the area where the gigantic species, *C. urabandai*, is absent.

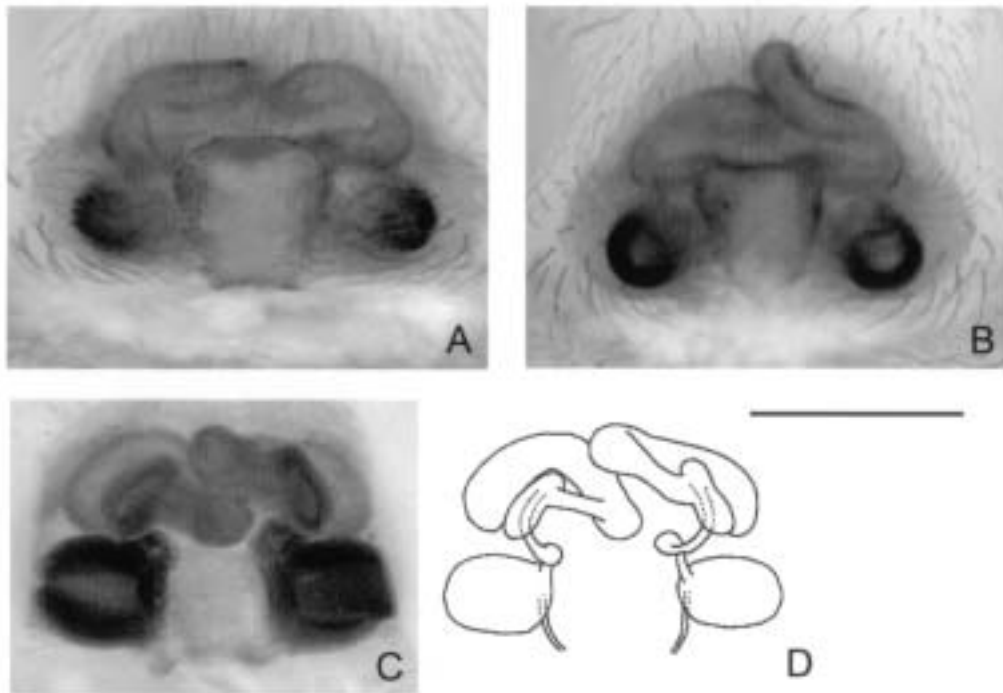


Fig. 16. Female genitalia of *Cybaeus yoshidai* n. sp. (paratypes): A-B epigynum, ventral view; C internal structure, dorsal view; D connection of spermathecae and ducts, dorsal view. (Scale: 0.5 mm)

Range of body size (in mm, means in parentheses; male $n=9$, female $n=14$): Carapace length, 3.53–5.02 (4.22) in male, 3.45–4.58 (3.93) in female; carapace width, 2.53–3.50 (3.03) in male, 2.35–3.20 (2.71) in female.

Specimens examined. Type series. The Shirabu Pass, Yonezawa-shi, Yamagata Prefecture, Japan: holotype (♂); paratypes (1♂4♀), 28-VIII-1995, K. Nojima leg.

Other specimens. YAMAGATA PREF. Same locality and date as the type series: 3♂5♀, YI. Yonezawa-shi, Seki, Shirabu Spa: 1♂2♀, 28-VIII-1995, KN; 1♀, 28-VIII-1995, YI. Higashitagawa-gun, Asahi-mura, Tamugimata, 1♀, 7-X-2003, TS. Nishitagawa-gun, Atsumi-chô, Mt. Maya: 1♂, 5-VIII-1989, HY; 1♀, 23-X-1989, HY. IWATE PREF. Morioka-shi, Asagishi, Ôshida, 1♀, 20-VII-1995, TS. MIYAGI PREF. Tamatsukuri-gun, Iwadeyama-machi, Ôkuchi, 1♂, 31-VIII-1990, TS.

Distribution. Iwate, Yamagata, and Miyagi Prefectures, northern Honshu, Japan (Fig. 14).

Remarks. *Cybaeus yoshidai* most resembles *C. urabandai* in shape of male palp within the same local species assemblage. However, this species is distinctly smaller than *C. urabandai* (Figs. 2 and 15). They can be distinguished also in male palp (Fig. 12, cf. B–C, F–I, K, M with A, D–E, J, L) and female genitalia (cf. Fig. 16A–D with 15A–C). The female genitalia of this species are unique and much different from those of the other Japanese species of the genus.

***Cybaeus sasakii* n. sp.**

[Japanese name: Michinoku-namihagumo]
(Figs. 3M–N, 4G–H, 17A–F, 18A–C)

Description. Male (holotype). Measurements (in mm). Body length 6.45; carapace length 3.26, width 2.30, head region width 1.29; abdomen length 3.35, width 2.85; sternum length 1.49, width 1.39; labium length 0.40, width 0.44. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total): Leg I: 2.67/ 1.01/ 2.45/ 2.44/ 1.58; 10.15. Leg II: 2.62/ 1.00/ 2.19/ 2.27/ 1.42; 9.50. Leg III: 2.32/ 0.92/ 1.74/ 2.24/ 1.22; 8.44. Leg IV: 2.94/ 0.98/ 2.39/ 3.08/ 1.50/ 10.89.

Thoracic region higher than head region (Fig. 4G). Anterior eye row straight as seen from front, posterior eye row straight as seen from above. Diameters of eyes: AME < PME < PLE < ALE; AME half to ALE. Ocular area wider than long, 2: 1 in ratio. Clypeus shorter than median ocular area, 1: 1.6 in ratio. Chelicerae weakly geniculate (Fig. 4G), promargin of fung furrow with 3 teeth (median one the largest), retromargin with 4 teeth and 5 denticles, and basally with lateral condyle. Legs rather long, length of legs: 4>1>2>3. Tibia I with 2-2-2-2 VS, 2 PLS and 1 RLS; metatarsus I with 2-2-3 VS, 2(left) or 3(right) PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS, 3 PLS and 1 RLS; metatarsus II 2-2-3 VS, 4 PLS and 1 RLS.

Palp (Fig. 17A–B). Relatively slender and long in propor-

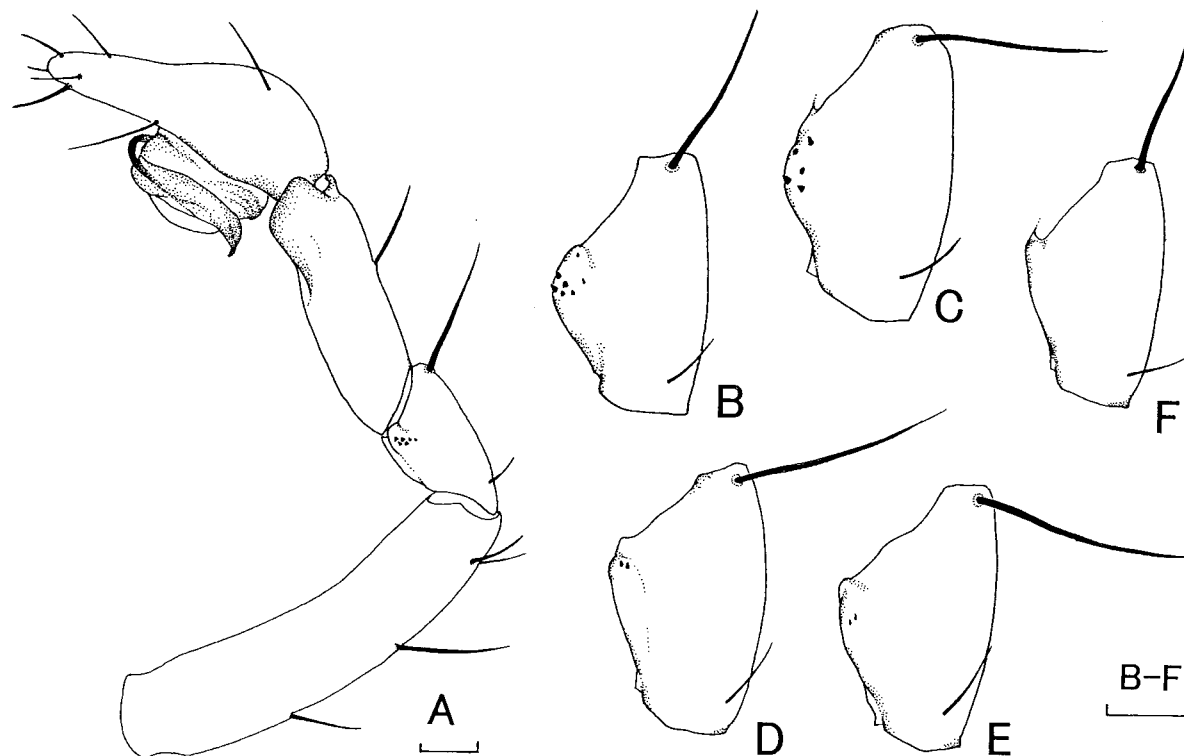


Fig. 17. Male left palp of *Cybaeus sasakii* n. sp. and variation of palpal patella: A–B holotype, Urabandai Plateau, Fukushima Pref.; C Morioka-shi, Iwate Pref.; D Akita-shi, Akita Pref.; E Miyamori-mura, Iwate Pref.; F Aomori-shi, Aomori Pref.—A retrolateral view; B–F patella, dorsolateral view. (Scale: 0.5 mm)

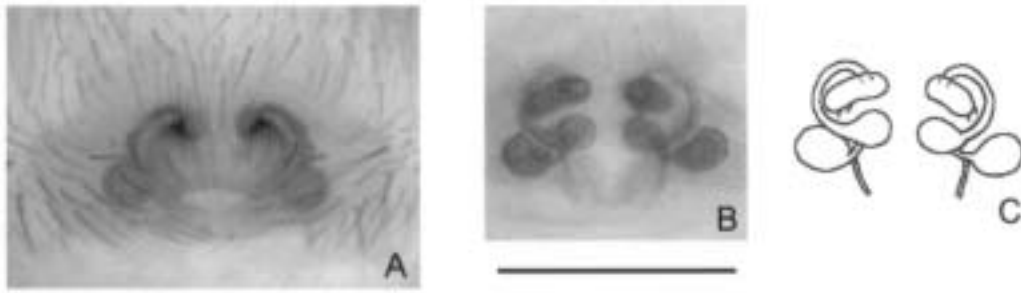


Fig. 18. Female genitalia of *Cybaeus sasakii* n. sp. (paratype): A epigynum, ventral view; B internal structure, dorsal view; C connection of spermathecae and ducts, dorsal view. (Scale: 0.5 mm)

tion, but cymbium rather short. Patella widened in middle, retrolaterally slightly depressed with 3 (left) or 4 (right) conical teeth. Tibia longer than patella, 1.1: 1 in ratio. Genital bulb oval, conductor simple without projections.

Coloration. Carapace bright yellowish brown, head region darker than thoracic region. Chelicerae, maxillae and labium bright brown; chelicerae darker than the others. Sternum bright yellowish brown. Legs bright yellowish brown without annulations. Abdomen, dorsally dull yellow with light yellow chevron pattern and ventrally light yellow.

Female. Measurements (in mm; one of the paratypes). Body length 6.10; carapace length 3.02, width 2.07, head region width 1.30; abdomen length 3.10, width 2.45; sternum length 1.38, width 1.28. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total) as follows. Leg I: 2.39/ 0.94/ 2.10/ 1.93/ 1.18; 8.54. Leg II: 2.20/ 0.94/ 1.88/ 1.89/ 1.10; 8.01. Leg III: 2.09/ 0.91/ 1.53/ 1.88/ 0.90; 7.31. Leg IV: 2.52/ 0.91/ 2.12/ 2.61/ 1.18; 9.34. Tibia I with 2-2-2 VS and 2 PLS; metatarsus I with 2-2-2 VS, 1 PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS and 3 PLS; metatarsus II 2-2-3 VS, 3 PLS and 1 RLS.

Similar to male in coloration. Carapace more slender, head region longer and rather larger (Fig. 3, cf. N with M). Chelicerae more geniculate (Fig. 4, cf. H with G). Abdomen larger and more rounded, legs shorter than those of male.

Genitalia (Fig. 18A-C). Epigynum simple, posteriorly with a narrow opening. Internal genitalia seen through the integument at the both sides of the genital opening: copulatory ducts arc-shaped; spermathecae round.

Variation. Shape of patellar apophysis of male palp considerably varies among populations (Fig. 17B-F).

Range of body size (in mm, means in parentheses; male $n=8$, female $n=9$): Carapace length, 3.15-3.70 (3.40) in male, 2.68-3.60 (3.16) in female; carapace width, 2.10-2.53 (2.32) in male, 1.70-2.23 (2.10) in female.

Specimens examined. Type series. Urabandai Plateau, Kitasiobara-mura, Yama-gun, Fukushima Prefecture, Japan: holotype (♂), 27-VIII-1995, Y. Ihara leg.; paratype (♀), 27-VIII-1995, K. Nojima leg.

Other specimens. AOMORI PREF. Aomori-shi, Takisawa, 1♂1♀, 2-X-1997, TS. IWATE PREF. Morioka-shi, Asagishi,

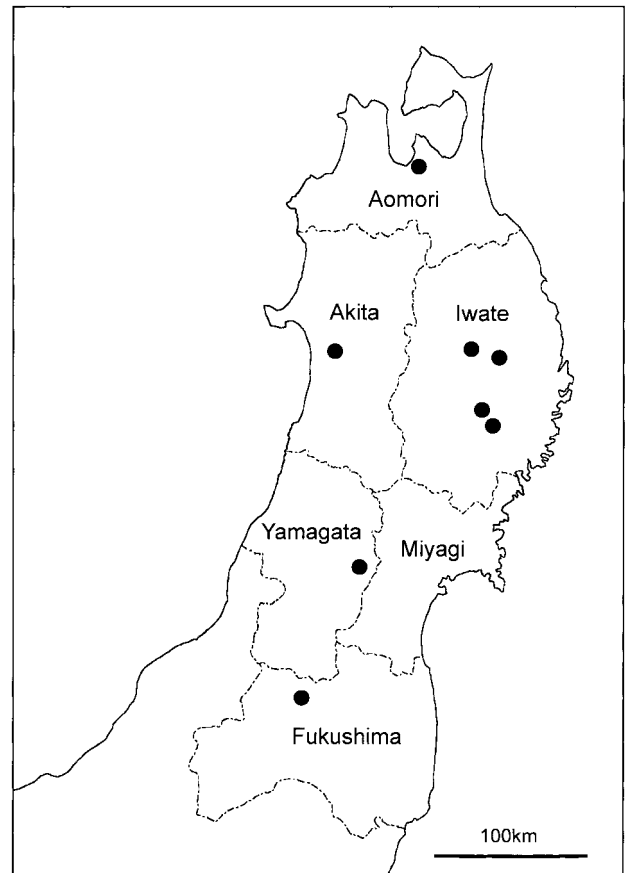


Fig. 19. Distribution of *Cybaeus sasakii* n. sp. in northern Honshu.

Ôshida, 1♂1♀, 28-IX-1995, TS. Tôno-shi, Otomo-chô, 1♀, 9-VII-1998, TS. Iwate-gun, Shizukuishi-chô, Genbu-dô Cave, 1♂1♀, 10-IX-1967, Kataoka. Kamihei-gun, Miyamori-mura, Simomiyamori, 1♂1♀, 7-X-1998, TS. Shimohei-gun, Iwaizumi-chô, 1♀, 13-IX-1998, Kaoru Yoshiga. AKITA PREF. Akita-shi, Shimokitate-takarakawa, 1♂1♀, 30-IX-1992, TS. YAMAGATA PREF. Higashine-shi Ôhinokizawa, 1♂2♀, 6-X-1986, HY. Yonezawa-shi, Seki, Shirabu Spa, 1♂1♀, 28-VIII-1995, YI.

Distribution. Aomori, Iwate, Akita, and Yamagata Prefectures, northern Honshu, Japan (Fig. 19).

Remarks. Male palp of *Cybaeus sasakii* resembles those of *C. nipponicus* and *C. kiuchii* Komatsu 1965 by having long tibia and genital bulb. However, cymbium of this species is short in proportion compared with those of *C. nipponicus* and *C. kiuchii*. Palpal apophysis of *C. sasakii* shows a condition intermediate in shape between *C. nipponicus* and *C. kiuchii*. Female genitalia of this species are clearly distinct from these two species.

***Cybaeus miyagiensis* n. sp.**

[Japanese name: Miyagi-namihagumo]

(Figs. 3I-J, 20A-F, 21A-C)

Description. Male (holotype). Measurements (in mm). Body length 7.50; carapace length 4.18, width 2.96, head region width 1.68; abdomen length 3.85, width 2.60; sternum length 1.93, width 1.68; labium length 0.55, width 0.63. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total): Leg I: 3.05/ 1.30/ 2.70/ 2.68/ 1.74; 11.47. Leg II: 2.95/ 1.25/ 2.42/ 2.54/ 1.56; 10.72. Leg III: 2.53/ 1.21/ 1.94/ 2.37/ 1.24; 9.29. Leg IV: 3.05/ 1.22/ 2.66/ 3.15/ 1.56; 11.64.

Head region higher than thoracic region. Anterior eye row straight as seen from front, posterior eye row straight as seen from above. Diameters of eyes: AME < PME = ALE < PLE; AME almost half to PLE. Ocular area wider than long, 2: 1 in ratio. Clypeus shorter than median ocular area, 1: 1.4 in ratio. Chelicera geniculate, promargin of fung furrow with 3 teeth (median one the largest), retromargin with 4 teeth and 5 denticles, and basally with lateral condyle. Legs relatively short, length of legs: 4>1>2>3. Tibia I with 2-2-2-2 VS and 1 (left) or 2 (right) PLS; metatarsus I with

2-2-3 VS, 2 (left) or 1 (right) PLS and 1 RLS; tibia II with 2-2-1(retromargin)-2 VS and 3 PLS; metatarsus II 2-2-3 VS, 4 PLS and 1 RLS.

Palp (Fig. 20A-D). Relatively thick and short in proportion. Patella with a large and long apophysis with 13 conical teeth. Tibia slightly longer than patella, 1.1: 1 in ratio. Genital bulb large and oval, conductor long.

Coloration. Carapace and chelicerae brown. Maxillae, labium and sternum bright brown. Legs yellowish brown with very faint grayish annulations. Abdomen dull yellowish brown.

Female. Measurements (in mm; paratype). Body length 8.80; carapace length 4.25, width 2.80, head region width 1.88; abdomen length 5.00, width 3.45; sternum length 2.04, width 1.75. Length of legs (femur/ patella/ tibia/ metatarsus/ tarsus; total) as follows. Leg I: 3.00/ 1.34/ 2.57/ 2.33/ 1.38; 10.62. Leg II: 2.82/ 1.36/ 2.36/ 2.27/ 1.28; 10.09. Leg III: 2.62/ 1.27/ 1.85/ 2.28/ 1.12; 9.14. Leg IV: 3.04/ 1.26/ 2.57/ 3.20/ 1.40; 11.47. Tibia I (left) with 2-2-2-2 VS and 1 PLS; metatarsus I with 2-2-3 VS, 1 PLS and 1 RLS; tibia II with 2-2-0-2 (left) or 2-2-1-1 (right) VS and 2 PLS; metatarsus II 2-2-3 VS, 3 PLS and 1 RLS.

Similar to male in coloration. Carapace more slender, head region longer and larger (Fig. 3, cf. J with I). Chelicerae strongly geniculate. Abdomen larger and more rounded, legs shorter than those of male.

Genitalia (Fig. 21A-C). Epigynum simple, posteriorly with rather small opening. Epigastric area very wide and trapezoid.

Variation. Males from Iwate Prefecture have a sharp patellar apophysis of palp compared with those from Miyagi

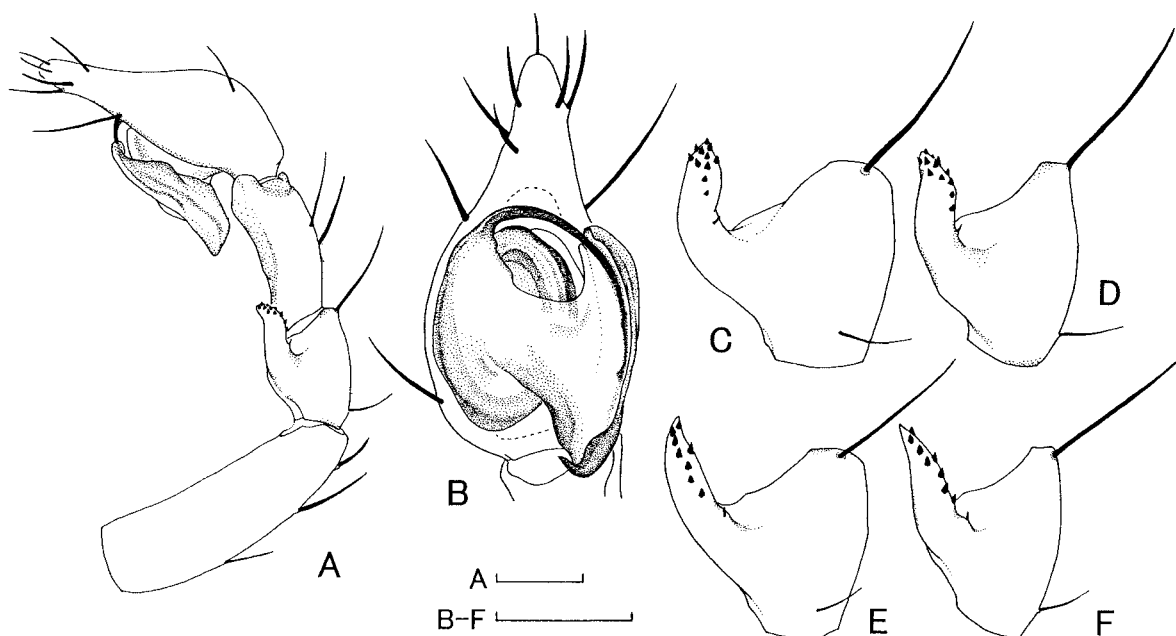


Fig. 20. Male left palp of *Cybaeus miyagiensis* n. sp. and variation of palpal patella: A-D holotype, Iwadeyama-machi, Miyagi Pref.; E-F Miyamori-mura, Iwate Pref.—A retrolateral view; B genital bulb, ventral view; C, E patella, dorsolateral view; D, F patella lateral view. (Scale: 0.5 mm)

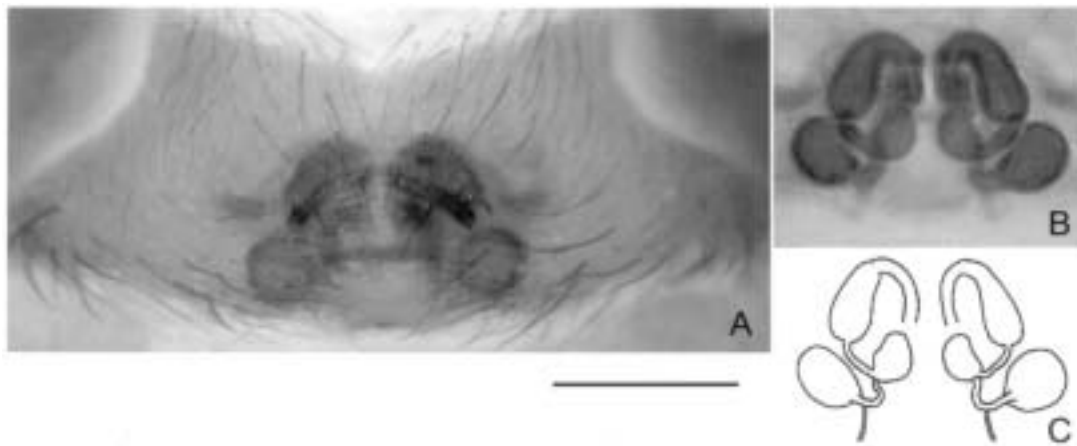


Fig. 21. Female genitalia of *Cybaeus miyagiensis* n. sp. (paratype): A epigynum, ventral view; B internal structure, dorsal view; C connection of spermathecae and ducts, dorsal view. (Scale: 0.5 mm)

and Fukushima Prefectures (cf. Fig. 20E-F and C-D).

Range of body size (in mm, means in parentheses; male $n=6$, female $n=3$): Carapace length, 3.95-4.56 (4.31) in male, 3.80-4.25 in female; carapace width, 2.66-3.20 (2.98) in male, 2.54-2.80 in female.

Specimens examined. Type series. Iwadeyama-machi, Tamatsukuri-gun, Miyagi Prefecture, Japan: holotype (♂); paratype (♀), 30-VIII-1990, T. Sasaki leg.

Other specimens. MIYAGI PREF. Oshika-gun, Onagawa-chô, Tsukahama, 1♂1♀, 21-IX-1994, TS. FUKUSHIMA PREF. Sôma-shi, Uno-o-misaki, 1♂1♀, 16-X-1990, TS. Sôma-gun, Shinchi-machi, Mt. Karô-san, 1♂, 27-X-1990, TS. IWATE PREF. Hienuki-gun, Ôhasama-machi, Kamegamori, 1♂, 4-III-1966, collector unknown. Kamihei-gun, Miyamori-mura, Simo-miyamori, 1♂, 7-X-1998, TS.

Distribution. Iwate, Miyagi, and Fukushima Prefectures, northern Honshu, Japan (Fig. 22).

Remarks. Males of *Cybaeus miyagiensis* are easy distinguishable from other species by having a unique patellar apophysis of palp.

Acknowledgments

I wish to express my thanks to Dr. Nobuo Tsurusaki, Tottori University, for his long-term direction and reading manuscript of the present paper. Thanks are also due to the late Prof. Takeo Yaginuma, Messrs. Tomoo Sasaki (Iwate), Koichi Nojima (Osaka), Ms. Mayumi Matsuda (Hokkaido), Drs. Hajime Yoshida (Yamagata) and Takahide Kamura (Otemon Gakuin University), for offering or loaning the invaluable specimens.

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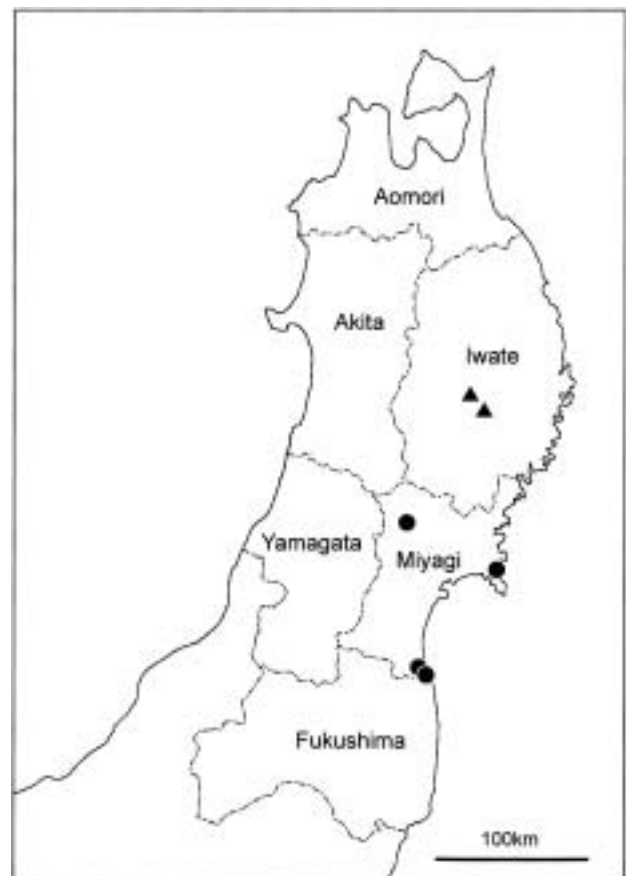


Fig. 22. Distribution of *Cybaeus miyagiensis* n. sp. in northern Honshu. Two populations (triangles) in Iwate Pref. differ from other localities (circles) in the shape of male palpal patellae as illustrated in Fig. 20E-F and C-D, respectively.

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