

Five New Species of Scymnini (Coleoptera, Coccinellidae) from East Asia

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Abstract Five new species, *Scymnus* (*Keiscymnus*) *kimon* sp. nov. from Japan, *Scymnus* (*Neopullus*) *yotsuhoshi* sp. nov. from Korea, *Sasajiscymnus* *kuriharai* sp. nov., *Sasajiscymnus* *jenai* sp. nov., and *Sasajiscymnus* *hosonaga* sp. nov. from Taiwan are described. *Keiscymnus* is assigned to *Scymnus* as a subgenus. A key to the genera and the subgenera of East Asian Scymnini is provided.

In this paper I describe five new species belonging to the subgenera *Keiscymnus* SASAJI, 1971 and *Neopullus* SASAJI, 1971 of the genus *Scymnus* KUGELANN, 1794 and the genus *Sasajiscymnus* VANDENBERG, 2004 from Japan and the neighbors. Even though scymnid genera have been well defined by CHAPIN (1965), SASAJI (1971), FÜRSCH (1987), etc., their generic assignments taxonomically confounded me. So I discuss the definitions of the genera and subgenera related to these new species.

Depositories of the materials are abbreviated as follows: the Osaka Museum of Natural History, Osaka (OMNH), the Ehime University Museum, Matsuyama (EUMJ), the collection of Tango, Wakasa Mushino-kai (CTWM), and my collection (CTK).

Before going into further details, I would like to express my hearty thanks to Mr. Kôzô MIZUNO for offering the specimens of *Scymnus* (*Keiscymnus*) *kimon* sp. nov. collected by the members of an insect study group, the Tango Wakasa Musino-kai, to Dr. Takashi KURIHARA and Mr. Masahiro SAITO for providing specimens, to Dr. Andreas PÜTZ for providing specimens by exchange, to Dr. Satoshi KAMITANI for the loan of the holotype of *Keiscymnus tosaensis* SASAJI, 1971 deposited in the Kyushu University, and to Dr. Nobuo OHBAYASHI for the invaluable advice on the manuscript.

Genus *Scymnus* KUGELANN, 1794

Scymnus Kugelann, 1794, 545 (type species: *Scymnus nigrinus* KUGELANN, 1794, by subsequent designation of KORSCHESKY, 1931, 115).

Subgenus *Keiscymnus* SASAJI, 1971

Keiscymnus SASAJI, 1971, 95 (type species: *Keiscymnus tosaensis* SASAJI, 1971, by original designation).

Remarks. *Keiscymnus* SASAJI, 1971 was established monotypically for *Keiscymnus tosaensis* SASAJI, 1971. At that time, he indicated the following generic characters: head capsule relatively long and small, quadrate, slightly broader than long; antenna 10-segmented with four apical segments forming a well-developed club which is fairly flat and oval; terminal segment of maxillary palpus distinctly narrowing apically; terminal segment of labial palpus spindle-shaped and very small, less than one-third the preceding; anterior part of pronotum well expanded anteriorly, almost concealing head capsule; tarsi three-segmented. The holotype of *K. tosaensis* has the three-segmented tarsi as shown in the original description (1971). However, the additional specimens identified as *K. tosaensis* by me based on the male genitalia have 4-segmented tarsi. I think it is not important character. As for the

pronotum, *Keiscymnus taiwanensis* YANG & WU, 1972 resembling *Scymnus tosaensis* in the structure of the antennae and the siphon has a pronotum not so distinctly concealing the head capsule.

Keiscymnus as well as *Scymnus* possesses the small and pubescent body, the short antennae, the almost straight anterior margin of prosternum, and the complete carinae of prosternum running from anterior to posterior margin. This genus resembles *Neopullus* by having the 10-segmented antennae, the two prosternal carinae running from anterior to posterior margin, and the complete femoral lines of abdomen continuously running from the coxal process to the external end of coxal cavity. And only the developed antennal clubs will serve to distinguish *Keiscymnus* from *Neopullus*. Moreover, *Keiscymnus* differs from the nominotypical subgenus of *Scymnus* by having the following few diagnoses: antennae 10-segmented; antennal club well swollen; femoral lines entire. Whereas in *Scymnus* (s. str.) these characters are as follows: antennae 11-segmented, with moderately developed club; femoral lines incomplete. Consequently *Keiscymnus* should be treated as a subgenus of *Scymnus*. I consider that the following characters are important for *Keiscymnus*: antennae 10-segmented with distinct club; prosternum with two carinae running from base to apex; femoral lines of abdomen entire.

***Scymnus (Keiscymnus) kimon* sp. nov.**

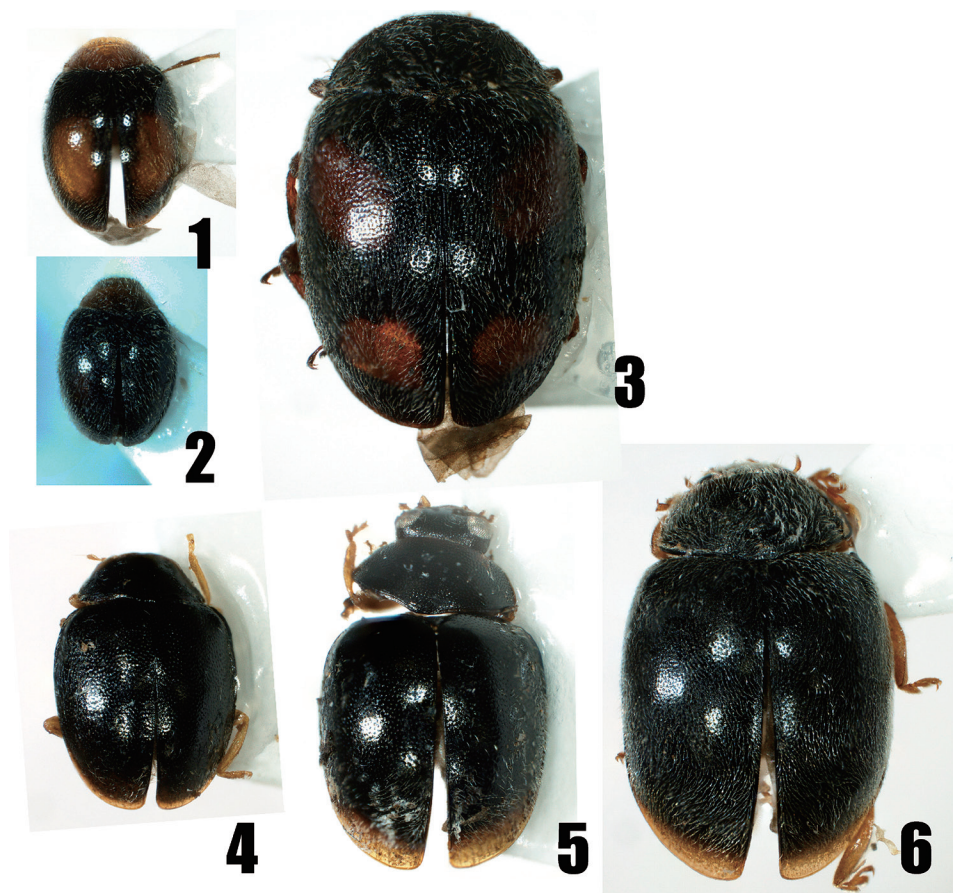
(Figs. 1, 2, 7–9)

Length 1.2–1.4 mm; width 0.8–0.9 mm. Body (Figs. 1, 2) small, ovate, constricted at the base of elytra, moderately convex above. Integument shining. Cuticle dark brown; head and legs orange brown; antennae and mouth parts pale yellow; prothorax, elytral oval spots which are apart from suture and lateral margins dull yellow; pronotum with dark spot which varies in size and is rarely vanished; elytral yellow spots variable in size and rarely completely reduced; margins of apical 1/4 of elytra faintly pale orange brown. Pubescence fine, suberect, pale brown; arrangement of elytral pubescence relatively simple, slightly directed outward at caudal area. Head well visible from above, moderately sunk into prothorax, sparsely and finely punctate, with large eyes of which interval is 1/3 of head width. Antennae with club well developed. Terminal segments of maxillary palpi subparallel-sided, obliquely truncate. Pronotum finely and densely punctate, weakly convex above, well sloping apicad; subscutellar line blunt, close to posterior margin. Scutellum subtriangular, longer than wide. Elytra sparsely punctate; width across the shoulders quiet wider than the base of pronotum. Prosternum with central trapezoid area divergent posteriad. Metasternum densely and conspicuously punctate; punctures becoming sparser and shallower towards the centre. Abdomen with femoral lines complete, close to posterior margin of 1st visible sternite, but apart from it; area surrounded by femoral lines almost impunctate; 5th sternite narrowly rounded at apex in male, and widened in female. Legs with femora stout; tibiae slender; tarsi 4-segmented; each claw with a small sharp process, but not so distinctly bifid.

Male genitalia. Siphon (Fig. 7) short, wrapped with membrane at the apex; tube with cleft exposing membrane; outer branch of siphonal capsule as long as inner one; median piece of tegmen (Figs. 8, 9) pointed at the apex, shorter than lateral lobes; lateral lobes wide, tapering apicad.

Female genitalia. Spermatheca C-shaped, strongly constricted near base; infundibulum short, slender, pigmented; coxites elongate.

Type series. Holotype: ♂ (genital segments are dissected), Nyou, Maizuru-shi, Kyoto-fu (M. T.), 1~20-IV-2010, T. MURAO leg. (OMNH). Paratypes: 1 ♀ (genital segments are dissected), ditto, 10~20-IV-2010 (CTK); 1 ex., ditto, 30-VIII~20-IX-2010 (CTWM); 1 ex., ditto, 10-X~30-X-2010 (CTWM); 2 exs., Uene, Maizuru-shi, Kyoto-fu (M. T.), 20-IV~10-V-2005, T. MURAO leg. (OMNH, CTK); 1 ex., Kuwagaikami, Maizuru-shi, Kyoto-fu (M. T.), 4~21-V-2008, K. YASUKAWA



Figs. 1–6. Habitus of Scymnini. — 1–2, *Scymnus* (*Keiscymnus*) *kimon* sp. nov.; 3, *Scymnus* (*Neopullus*) *yotsuhoshi* sp. nov.; 4, *Sasajiscymnus* *kuriharai* sp. nov.; 5, *Sasajiscymnus* *jenai* sp. nov.; 6, *Sasajiscymnus* *hosonaga* sp. nov.

leg. (OMNH); 1 ex., Maizuru-shi, Kyoto-fu (M. T.), 30-IX~20-X-2011, T. MURAO leg. (CTWM); 1 ex., Mt. Kusuyaga, Obama, alt. 500 m, Fukui, 31-V-2003, S. INOUE leg. (CTK). The specimens were collected by malaise traps (M. T.) or a chemoattractant called Akane call.

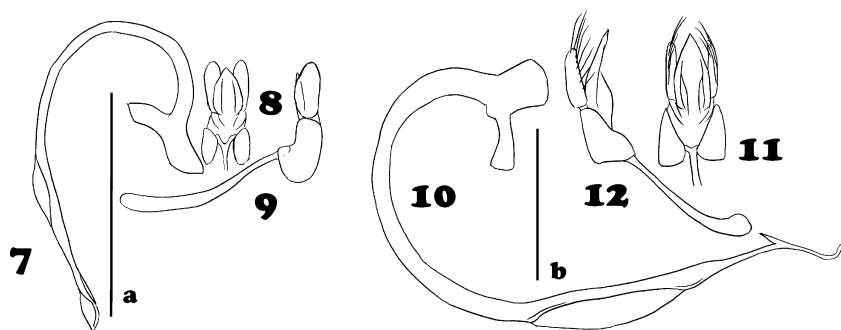
Etymology. The specific epithet is derived from a Japanese term based on the yellow markings.

Distribution. Honshu, Japan.

Remarks. This species resembles *Scymnus* (*Keiscymnus*) *tosaensis* (SASAJI, 1971) known from Honshu and Shikoku of Japan except for the following points: body more flashy by the yellow maculation; head more visible from above than the latter of which head is more deeply sunk into prothorax; median piece of tegmen pointed at the apex.

Subgenus *Neopullus* SASAJI, 1971

Scymnus (*Neopullus*) SASAJI, 1971, 177 (type species: *Scymnus hoffmanni* WEISE, 1879, by the original designation).



Figs. 7–12. Male genitalia of *Scymnus* spp. — 7–9, *Scymnus (Keiscymnus) kimon* sp. nov.; 10–12, *Scymnus (Neopullus) yotsuhoshi* sp. nov. — 7 & 10, Siphon, lateral view; 8 & 11, tegmen, lateral view; 9 & 12, ditto, ventral view. Scale bars: 0.5 mm; a for 7–9; b for 10–12.

Remarks. SASAJI (1971) established a new subgenus *Neopullus* under the genus *Scymnus* with the type species, *Scymnus hoffmanni* WEISE, 1879 which has evenly punctate semicircular areas of 1st visible abdominal sternite surrounded by femoral lines. In the description, he pointed out that *Sc. otohime* KAMIYA, 1961 and *Sc. taishuensis* SASAJI, 1971 had unevenly punctate semicircular areas surrounded by femoral lines. Since then many species occurring within Palearctic Region had been assigned to this subgenus. FÜRSCHE (1987) treated *Scymnus ater* KUGELANN, 1794 as a member of *Neopullus*. However, it is different from *Neopullus* by having a smooth prosternal disc without carinae, and should be contained to the subgenus *Didion* Casey, 1899 of *Scymnus*. I doubt that more species placed in *Neopullus* are also quite different from the type species. For example, seven Chinese species have the following characters: semicircular area of 1st visible sternite unevenly punctate; siphonal apex of male simple (YU *et al.*, 2000).

Although it is not easy to revise *Neopullus*, I briefly define its features as follows: body ovate, weakly convex above; antennae 10-segmented and not forming a distinct club; prosternum with two carinae running from base to apex; femoral lines complete; legs moderately long in length.

***Scymnus (Neopullus) yotsuhoshi* sp. nov.**

(Figs. 3, 10–12)

Length 2.8–2.9 mm; width 1.9–2.0 mm. Body (Fig. 3) large, ovate, weakly convex above. Cuticle black; head, mouth parts, antennae, and legs yellowish brown; anterior corners of pronotum dark brown; elytral vaguely oval spots dark reddish brown, which form a square. Pubescence on dorsum whitish gray, short, recumbent; lateral area of pronotum densely and stoutly pubescent; arrangement of elytral pubescence gently sinuate besides suture; metasternum and abdomen clothed with long reddish pubescence.

Head flat, finely punctate; eyes moderate in size, of which interval is wide, 5/9 of head width; terminal segments of maxillary palpi various in shape as subparallel-sided to slightly dilated apicad. Pronotum finely and densely punctate, gently convex above. Scutellum subtriangular, various in shape. Elytra subparallel-sided, densely punctate; punctures larger than those on pronotum. Prosternum rugose, with triangular area surrounded by central two carinae. Metasternum densely punctate; punctures becoming sparser towards the centre. Abdomen densely and finely punctate; femoral lines complete, contiguous to posterior margin of 1st visible sternite; surrounded area by femoral line densely punctate; punctures sparser than those of outside of semicircular area; 5th visible sternite of

male well emarginate; 6th of male subtruncate. Legs with long femora; tibiae slender; claws bifid.

Male genitalia. Siphon (Fig. 10) long, with sharp process near the apex; tube with cleft exposing membrane; apex slender, filiform; inner branch of siphonal capsule longer and slenderer than outer one; median piece of tegmen (Figs. 11, 12) longer than lateral lobes.

F e m a l e. Unknown.

Type series. Holotype: ♂ (genital segments are dissected), "in Kyongpuk Univ., Taegu, Kyongsangpuk Do, Korea, VIII-11-1979, K. USHIJIMA leg." (EUMJ). Paratype: 1 ♂, same data as for the holotype (EUMJ).

Etymology. The specific epithet is derived from the Japanese term meaning four stars.

Distribution. South Korea.

Remarks. This species may be easily recognized by the large and flat body and the 4-spotted elytra. But this species resembles *Scymnus (Neopullus) taishuensis* SASAJI, 1971 from Tsushima Is., Japan and *Scymnus (Neopullus) otohime* KAMIYA, 1961 from Japan by having the abdominal semicircular area which is unevenly and sparsely punctured.

Genus *Sasajiscymnus* VANDENBERG, 2004

Sasajiscymnus VANDENBERG, 2004, 483 (replacement name for *Pseudoscymnus* CHAPIN, 1962).

Pseudoscymnus CHAPIN, 1962, 483 (type species: *Scymnus hareja* WEISE, 1879, by original description).

Remarks. The members of this genus are so various in the body size and shape, the eye size, the shape of the carinate area of prosternum, the genital structure of both sexes, so that I often confuse them with *Axinoscymnus* KAMIYA, 1963, *Clitostethus* WEISE, 1885, or *Scymnus* KUGELANN, 1794. Nevertheless, they will be picked from scymnids by the short antennae and the long antennal setae.

Sasajiscymnus kuriharai sp. nov.

(Figs. 4, 13–15)

Length 1.7–1.8 mm; width 1.3 mm. Body (Fig. 4) small, ovate, weakly convex above. Cuticle black; frons of male, antennae, mouth parts, 4th and 5th visible abdominal sternites, legs and apical 2/7 of elytra dull yellow; anterior margin of pronotum faintly becoming yellow. Pubescence pale gray. Head finely and sparsely punctate; interval of eyes as wide as width of an eye. Pronotum weakly convex above, finely and densely punctate; subscutellar line distinct, well apart from posterior margin. Scutellum pentagonal, rounded at anterior corners, somewhat various in shape. Elytra weakly convex above, arcuately tapering at sides, densely punctate; punctures more conspicuous and sparser than those of pronotum; caudal area narrow. Prosternum with rectangular area which is 7/4 times as long as wide. Metasternum densely punctate; punctures becoming sparser towards the centre. Abdomen with femoral lines incomplete, apart from posterior margin, well curving laterally; 5th subtruncate in male, widely rounded at apex in female; 6th notched at apex in male, whereas in female simple, not notched, concealed by 5th; ultimate and penultimate tergites simple. Legs with femora somewhat long; tibiae slender.

Male genitalia. Siphon (Fig. 13) long, simple at the apex, gently tapering apicad; inner branch of siphonal capsule long; outer branch reduced; median piece of tegmen (Figs. 14, 15) long subparallel-sided, bluntly pointed, gently curving downward near the apex; lateral lobes rather short, slender.

Female genitalia. Coxites wide and rounded at apex; spermatheca simple, C-shaped.

Type series. Holotype: ♂ (genital segments are dissected), Fushan, altitude 600 m, Wulai Township, Taipei, Taiwan, 29-III-2004, T. KURIHARA leg. (EUMJ). The dorsal hairs of holotype were

almost denuded. Paratype: 1 ♀ (genital segments are dissected), Taiping, Taitung Hsien, Taiwan, 7-V-1972, M. SAKAI leg. (EUMJ).

Etymology. The specific epithet is dedicate to the collector, Dr. Takashi KURIHARA, who kindly gave me various information on the taxonomic study.

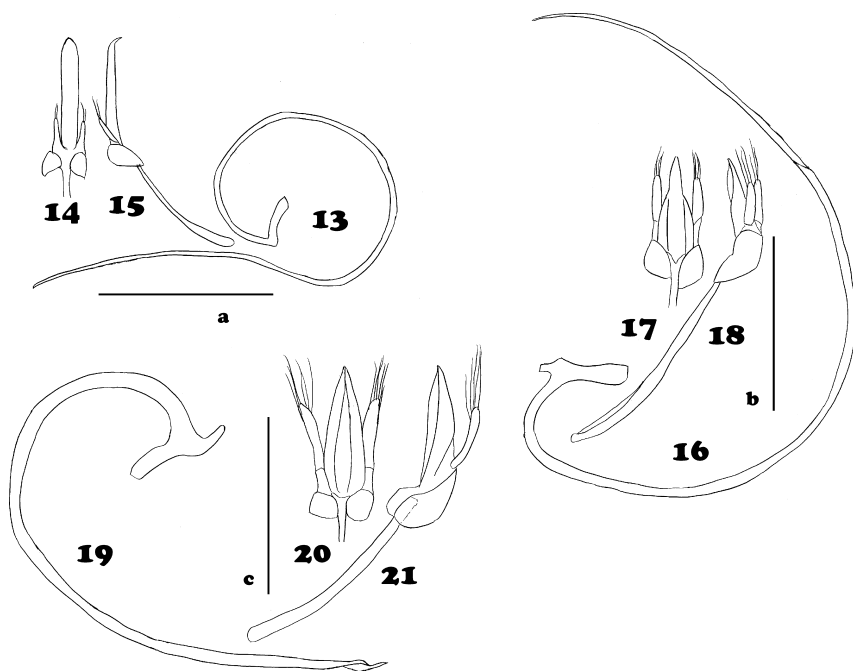
Distribution. Taiwan.

Remarks. This species shows sexual dimorphism: frons reddish in male, black but faintly pale at apex in female; 5th abdominal sternite of male narrower than that of female; 6th notched in male instead of the simple in female. This species is plain in the appearance by the small and black body like *Sasajiscymnus kurohime* (MIYATAKE, 1959) from Okinawa, Japan and Tiwan, *Sa. tainanensis* (OHTA, 1929) from Taiwan, *Sa. nagasakiensis* (KAMIYA, 1961) from Kyushu and Okinawa, Japan, and *Sa. anmashanus* (YANG, 1971) from Taiwan, but is readily distinguished from them by the gently convex body and the large eyes.

Sasajiscymnus jenai sp. nov.

(Figs. 5, 16–18)

Length 2.0 mm; width 1.8 mm. Body (Fig. 5) small, short oval, strongly convex above. Cuticle black; antennae, mouth parts, legs yellowish brown; anterior margin of pronotum faintly brown; edge of apical 2/7 of elytra dull yellow. Pubescence whitish, somewhat stout, directed laterally on caudal area of elytra. Head finely and densely punctate; eyes moderate in size, of which interval is 2/5 of



Figs. 13–21. Male genitalia of *Sasajiscymnus* spp. — 13–15, *Sasajiscymnus kuriharai* sp. nov.; 16–18, *Sasajiscymnus jenai* sp. nov.; 19–21, *Sasajiscymnus hosonaga* sp. nov. — 13, 16 & 19, Siphus, lateral view; 14, 17 & 20, tegmen, ventral view; 15, 18 & 21, ditto, lateral view. Scale bars: 0.5 mm; a for 13–15; b for 16–18; c for 19–21.

head width. Pronotum densely punctate; punctures becoming finer and denser towards anterior corners; subscutellar line weakly impressed, close to posterior margin. Scutellum subtriangular, slightly longer than wide. Elytra shining, with developed shoulders; sides arcuate; caudal area wide. Prosternum with rectangular area which is twice as long as wide. Metasternum densely punctate; punctures becoming sparser and shallower towards the centre. Abdomen with femoral lines weakly arcuate, close to posterior margin of 1st visible sternite, obsolescent laterally; 5th wide, subtruncate at apex in male. Legs with femora moderate in length; tibiae slender; claws bifid.

Male genitalia. Siphon (Fig. 16) slender and long, with long flagellum; inner branch of siphonal capsule long; outer branch short, rather reduced; median piece of tegmen (Figs. 17, 18) thick, sharp, wide at base; lateral lobes long, half in the length of median piece.

F e m a l e. Unknown.

Type series. Holotype: ♂ (genital segments are dissected), Jenai, Nantou Hsien, Taiwan, 18–VI–1968, M. TOMOKUNI leg. (EUMJ). The holotype got lost the middle and hind legs.

Etymology. The specific epithet is derived from the type locality.

Distribution. Taiwan.

Remarks. This species resembles *Sasajiscymnus kurohime* (MIYATAKE, 1959) from Okinawa, Taiwan, and China only in the exterior, but the latter male genitalia lacks a long exposed flagellum of siphon. This species is also similar to *Sa. pilicrepus* (LEWIS, 1896) from Japan both in the exterior and in the male genitalia. But the latter is larger in size and broader in shoulders than those of this new species.

Sasajiscymnus hosonaga sp. nov.

(Figs. 6, 19–21)

Length 2.7 mm; width 1.8 mm. Body (Fig. 6) moderate in size, ovate, moderately convex above. Cuticle black; antennae, mouth parts, margins of apical 1/4 of elytra, abdomen except for black metacoxal process, and legs dull yellow. Pubescence short, whitish gray; arrangement of elytral pubescence rather gently sinuate. Head densely punctate; eyes moderate in size, of which interval is a half of the head width. Pronotum weakly convex above, densely punctate; punctures sparser than those of head; subscutellar line feebly impressed and close to posterior margin. Scutellum subtriangular, slightly wider than long. Elytra densely punctate; punctures slightly sparser than those on pronotum. Prosternum with rectangular area which is 5/3 times as long as wide. Metasternum densely punctate. Abdomen with femoral lines close to posterior margin of 1st visible sternite, running parallel to posterior margin, slightly curving and reduced laterally; 5th of male rounded to subtruncate. Legs with femora stout, moderate in length; tibiae slender; claws bifid.

Male genitalia. Siphon (Fig. 19) with short exposing flagellum; inner branch of siphonal capsule longer and wider than outer branch; outer branch rather reduced; median piece of tegmen (Figs. 20, 21) long, slender, thick, longer than lateral lobes, 3/4 times as long as lateral lobes; lateral lobes with long setae.

F e m a l e. Unknown.

Type series. Holotype: ♂ (genital segments are dissected), Sungkang~Meifeng, (2044–2127), Nantow Co., Taiwan, 18–V–1969, S. HISAMATSU leg. (EUMJ).

Etymology. The specific epithet is derived from a Japanese term meaning slender and elongate.

Distribution. Taiwan.

Remarks. The appearance of this new species might resemble that of *Scymnus nigrinus* KUGELANN, 1794, but this species is distinguished immediately from the latter by the short antennae.

This species is also similar to *Sasajiscymnus nakanei* (ARAKI, 1963) or *Sasajiscymnus sylvaticus* (LEWIS, 1896) by having the subparallel-sided body, the feebly impressed subscutellar line close to the posterior margin of pronotum and the exposed apical flagellum of siphon, but differs from them by the shorter apical siphonal flagellum.

Key to the Genera and the Subgenera of East Asian Scymnini

In this paper, I regarded the following seven genera and five subgenera as the members of East Asian Scymnini.

- 1(2) Femoral lines of abdomen without associate line laterally, the lines reaching posterior margin of 1st visible sternite. *Diomus*
- 2(1) Femoral lines of abdomen with lines extending laterally, the lines often reaching posterior margin, but sometimes apart from posterior margin of 1st visible sternite.
- 3(4) Terminal segments of antennae conical. *Clitostethus*
- 4(3) Terminal segments of antennae subtruncate.
- 5(6) Terminal segments of antennae with long stout setae. *Sasajiscymnus*
- 6(5) Terminal segments of antennae without long setae.
- 7(8) Median part of anterior margin of prosternum concealed by large head. *Axinoscymnus*
- 8(7) Median part of anterior margin of prosternum visible.
- 9(12) Disc of prosternum without carinae.
- 10(11) Femoral lines of abdomen complete. *Scymnus (Didion)*
- 11(10) Femoral lines of abdomen incomplete. *Nephus*
- 12(9) Disc of prosternum with carinae.
- 13(14) Two carinae of prosternum convergent behind anterior margin. *Horniolus*
- 14(13) Two carinae of prosternum apart from each other, or convergent at anterior margin of prosternum.
- 15(18) Femoral lines of abdomen incomplete.
- 16(17) Antennae 11-segmented. *Scymnus (s. str.)*
- 17(16) Antennae 10-segmented. *Scymnus (Parapullus)*
- 18(15) Femoral lines of abdomen complete.
- 19(20) Antennae 11-segmented. *Scymnus (Pullus)*
- 20(19) Antennae 10-segmented.
- 21(22) Body weakly convex above. Antennae not forming distinct club. *Scymnus (Neopullus)*
- 22(21) Body moderately convex above. Antennae forming distinct club. *Scymnus (Keiscymnus)*

要 約

北野峻伸：東アジア産ヒメテントウムシ族（コウチュウ目テントウムシ科）の5新種の記載。—— *Scymnus (Keiscymnus) kimon* sp. nov. を日本から、*Scymnus (Neopullus) yotsuhoshi* sp. nov. を韓国から、*Sasajiscymnus kuriharai* sp. nov. と *Sasajiscymnus jenai* sp. nov., *Sasajiscymnus hosonaga* sp. nov. を台湾からそれぞれ記載した。*Keiscymnus* 属を区別する顕著な徴表が少ないことから *Scymnus* 属の亜属と見なした。東アジア産ヒメテントウムシ族の属及び亜属の検索表を作成した。

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