

Taxonomical notes and descriptions of Japanese Halyziini (Coleoptera: Coccinellidae)

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Taxonomy, new species, key to tribes, key to genera, Coleoptera, Coccinellidae, *Halyzia*, *Vibidia*, Halyziini, Japan

Abstract. Three new species, *Halyzia ichiyanagii* sp. nov., *Vibidia fukudai* sp. nov., and *Vibidia saitoi* sp. nov. are described, illustrated and compared. *Scymnus* (*Neopullus*) *yotsuhoshi* Kitano, 2012 is newly transferred to the nominotypical subgenus of *Scymnus* Kugelann, 1794.

INTRODUCTION

Many species of ladybirds are widely distributed in the Palaearctic Region (Korschevsky 1932; Kovář 2007; Sasaji 1971). However, some of them might be divided into several independent species. Dr. Ichiyanagi went to museums in Germany and the neighboring for the examination of tenebrionid collections and brought me a specimen resembling *Halyzia sedecimguttata* (Linnaeus, 1758). *H. sedecimguttata* collected at Japan are distinguishable from it by the elytra, so that they are described as a new species. Furthermore, I would like to add two species of *Vibidia* Mulsant, 1846 to Japanese fauna and note on Japanese Halyziini. As a result of this study, four genera and six species are recognized from Japan.

MATERIALS AND METHODS

Photos in this article were taken with a digital camera, Stylus TG4, Olympus and the microscope, SMZ 745, Nikon and GR-D8T2, Shodensha. The holotype is deposited in the Osaka Museum of Natural History, Japan (OMNH). Paratypes are in the author's collection. The holotypes were measured as to their body length and width. These measurements are indicated behind the range of values.

TAXONOMY

Halyziini Mulsant, 1846

Diagnosis. Body oval in dorsal view, weakly to moderately convex above. Integuments glabrous. Eye coarsely and granularly faceted; transverse ridge of eye wide, placed in dorsal surface of eye. Antenna long; terminal three segments forming club, relatively large, loosely

articulated. Mandible bifid at apex, finely to coarsely serrate along ventral margin. Terminal segment of maxillary palpi moderately to strongly dilated. Terminal segment of labial palpi tumid, pyriform. Pronotum transverse, weakly convex above, with translucent area along anterior margin; anterior corner weakly prominent. Prosternum T-shaped, constricted, not concealing mouthparts. Tibia slender, simple, without apical spurs. Abdomen: first exposed sternite relatively short, slightly longer than second; abdominal femoral line almost reaching hind margin of the first visible sternite.

Included genera. *Halyzia* Mulsant, 1846, *Macroilleis* Miyatake, 1965, *Vibidia* Mulsant, 1846, *Thea* Mulsant, 1846, *Illeis* Mulsant, 1850, *Kihiro* Kitano, 2014, *Psyllobora* Chevrolat, 1837

Note. Halyziini resembles Coccinellini Latreille, 1807 by having the glabrous and colorful integument, the large transverse ridge of eye, and the narrow area between mesocoxae. However, it is distinguishable from most of the latter by the deeply inserted head into the prothorax, the developed antennal club, the serrate edge of the mandible, the tumid terminal segment of labial palpi, the transparent anterior area of pronotum, and weakly prominent anterior corner of pronotum. Mulsant (1850) revised Coccinellidae including Halyziinae. Korschefsky (1932) treated some genera of Halyziinae as members of Coccinellini. Sasaji (1968) distinguished Psylloborini Casey, 1899 from Coccinellini as follows: Anterior margin of clypeus truncate without an anterior projection on each side; antennal insertion more frontally situated, mandible often with a multi-denticulate tip but not always; anterior margin of pronotum weakly sinuate and with rounded corners; maxillary galea quadrate. Korschefsky (1932) and Sasaji (1971) recognized Halyziini as a junior synonym of Psylloborini. Psylloborini of Korschefsky (1932) was composed of many genera, and some of them were not studied in this paper. Most genera of Sasaji's Psylloborini (1968) are contained in Halyziini referred here.

Halyziini of Japan might be divided into two or three groups. The group 1 consists of *Halyzia*, *Macroilleis*, *Thea*, and *Vibidia*. They have the apical flagellum on the siphon. The group 2 consists of *Illeis* and *Kihiro* which lack the apical flagellum of the siphon. According to figures in the original description, *Eothea* Iablokoff-Khuzorian, 1986 has a resembling siphon, so it might belong to group 2. These two groups have the large transverse ridge of eye and the symmetrical tegmen. I hesitate to include *Psyllobora vigintimaculata* (Say, 1824) in these two groups since it has a small transverse ridge of eye, short prosternum, and asymmetric tegmen. Members of *Psyllobora* are diverse in the structure of male genitalia. According to González and Almeida (2017) some species of *Psyllobora* have symmetrical tegmen.

***Halyzia* Mulsant, 1846**

This genus resembles *Macroilleis* Miyatake, 1965 by having the large body and the appendices of siphonal apex. However, it is distinguished from the latter by the smaller eye and weakly dilated terminal segment of maxillary palpi. Perhaps one species occurs in Japan.

Halyzia sedecimguttata (Linnaeus, 1758)

This species was recorded from Japan by Kurisaki (1923) for the first time. However, I have examined no specimen collected in Japan. Most of the records might be based on *H. ichiyangagii*.

Halyzia ichiyangagii sp. nov.

(Fig. 1)

Type material. Holotype (♂): Nukunitouge, Neo, Motosushi, Gifu, Japan, 15.VIII.1998, K. Toyoshima leg. Paratypes: (5 spec.): Aizankei, Kamikawagun, Hokkaido, Japan, 43°43'11.3"N, 142°48'49.7"E, 2.VII.2016, Y. Sakamoto leg.; (1 spec.): Naeba, 26.VII.1971, K. Masumoto leg.; (1 spec.): Yasya-ike, Imajo-cho, Fukui, Japan, 18.VI.1978, M. Saito leg.; (1 spec.): Karikomi-no-ike, Oono-shi, Fukui, 23.V.1982, M. Saito leg.; (3 spec.): Hiwada, Takanemachi, Takayamashi, Gifu, 5.VIII.2005, K. Toyoshima leg.; (1 spec.): Mt. Narabara, Imabarishi, Ehime, 2.VI.2006, T. Kitano leg.; (4 spec.): Shikoku Karst, Tengukogen, 18.VIII.2010, S. Matsuo leg.; (8 spec.): Tengukogen, Kumakogencho, Ehime, 17-18.VIII.2010, R. Nitta leg.

Description. Male. Body large, 5.5-6.3 (5.5) mm in length, 4.4-4.6 (4.6) mm in width. Color orange brown; head, lateral part of pronotum, mesepimeron, and metepisternum brownish white; external margin of pronotum and elytra translucent; elytron with 8 brownish white spots. Integument glabrous. Head concealed by pronotum, flat on disc, shallowly emarginate at antennal insertion; punctures inconspicuous; clypeus truncate, not emarginate; interval of eyes as wide as labrum; eye coarsely and granularly faceted; transverse ridge of eyes broad, placed in dorsal surface; antennae 11-segmented, longer than head width; scape tumid, elongate; pedicel moniliform, smaller than scape; flagellum filiform; club weakly serrate, composed of three segment; terminal segment elongate oval; mandible bifid, sharply serrate at external margin; serration directed inward. Pronotum transverse, weakly convex above, shagreened, densely and finely punctate, weakly emarginate at anterior margin; punctures denser than those of elytra; each corner rounded; lateral area weakly concave. Elytra weakly convex above, finely punctate; side evenly explanate except for narrower caudal area, gently tapering apicad. Elytral epipleuron concave inward without deep depression for receiving tip of hind leg. Epipleuron of pronotum weakly concave. Prosternum with weak carinae on sides of prosternal process, not extending to disc. Anterior margin of mesosternum weakly arcuate. Metasternum convex below at posterior area. Legs: tibiae slender, simple, without apical spurs; claws with basal quadrate appendix; appendix half times as long as claws. Abdomen: first exposed sternite with weakly impressed femoral lines, 1.5 times as long as second; sixth sternite emarginate at posterior margin. Male genitalia: siphonal apex with a translucent long flagellum and pigmented short sclerites; outer sclerite short; inner sclerite long, recurved; siphonal tube strongly curving at basal part; siphonal capsule distinct; outer branch somewhat larger than inner branch.

Females. 5.3-6.1 mm in length; 3.9-4.7 mm in width. Closely resembling male. Sixth sternite faintly exposed, not emarginate at apex. Female genitalia: spermatheca branched at base; infundibulum absent; duct between bursa copulatrix and spermatheca not pigmented.

Differential diagnosis. This species has a narrow explanate area of elytra, while *H. sedecimguttata* has a broad elytral explanate area. The male genitalia of both species are alike. Furthermore, this species resembles the individuals occurring within Eastern Russia and China by having the simple elytral form. Their elytral spots are contiguous longitudinally, while the spots of *H. ichiyanagii* are separated.

Etymology. The specific epithet is dedicated to Takashi Ichiyanagi who is a specialist in Tenebrionidae.

***Vibidia* Mulsant, 1846**

Crotch (1874) sunk this genus into a junior synonym of *Thea* Mulsant, 1846. These two genera are alike except for color arrangement. It should be difficult to identify members of *Vibidia* without examination of the structure of male genitalia. The identification of female specimens is difficult in many species. Two species described here are based on male specimens only.

***Vibidia duodecimguttata* (Poda, 1762)** (Figs. 4, 5)

Closely resembling *V. fukudai* sp. nov. Male genitalia: siphonal apex with well pigmented sclerite wrapped with translucent membrane; inner branch of siphonal capsule slightly smaller than outer branch; outer branch as long as apical pigmented sclerite; median piece of tegmen parallel-sided in basal part, with one oblique process arising from base of apical curving which is occupying apical 1/2.

This species was recorded from many countries of the Palaearctic region. Lewis (1873) recorded it from Yokohama, Japan based on the specimens determined by Crotch. Sasaji (1971) recorded it from Hokkaido, Honshu, Shikoku and Kyushu of Japan. However, I have examined no specimen collected in Japan. Most records from Japan might be based on *Vibidia saitoi* and *V. fukudai*. I tentatively identify German specimens which I have examined as *V. duodecimguttata* based on the presence of only one valid name.

***Vibidia fukudai* sp. nov.** (Figs. 2, 6, 7)

Type material. Holotype (♂): Mt. Koubou, Hadanoshi, Kanagawaken, Japan, 9.IV.2016, Y. Fukuda leg. Paratypes: (1 spec.): TUA, Funako, Atsugishi, Kanagawa, 20.XI.2016, Y. Fukuda leg.; (2 spec.): Inagichuokouen, Nagamine, Inagishi, Tokyo, 35°37'59.0"N, 139°29'17.6"E, 22.IV.2017, Y. Sakamoto leg.; (1 spec.): Koubeshi, Hyougo, 7.VII.1989, M. N, M. T. & K. T. leg.

Description. Male. Body large, 3.5-3.8 (3.8) mm in length, 2.8-3.0 (3.0) mm in width. Color orange brown; head, mesepimeron, and metepisternum brownish white; external margin of pronotum and elytra translucent; lateral part of pronotum with two brownish white spots; elytron with 6 brownish white spots. Integument glabrous. Head concealed by pronotum,

flat on disc, shallowly punctate, emarginate at antennal insertion; clypeus truncate, rounded at lateral corners; interval of eyes as wide as labrum; eye coarsely and granularly faceted; transverse ridge of eye broad, situated dorsally; antenna 11-segmented, longer than head width; scape tumid, elongate; pedicel moniliform, smaller than scape; flagellum filiform; club weakly serrate, composed of three segments; terminal segment elongate oval; mandible bifid, coarsely serrate at external margin; serration often abraded. Pronotum transverse, weakly convex above, densely and finely punctate, weakly emarginate at anterior margin; punctures denser than those of elytra; each corner rounded. Elytra weakly convex above, explanate laterally, finely punctate; explanate area relatively narrow, tapering apicad. Epipleuron of pronotum weakly concave. Prosternum without carina. Anterior margin of mesosternum weakly arcuate. Metasternum convex below at posterior area. Legs: tibiae slender, simple, without apical spurs; claws with basal quadrate appendix; appendix half times as long as claws. Abdomen: first exposed sternite with weakly impressed femoral lines, 1.5 times as long as second; sixth sternite emarginate at posterior margin. Male genitalia: siphonal apex with well pigmented sclerite wrapped with translucent membrane; sclerite weakly recurved; inner branch of siphonal capsule slightly smaller than outer branch; outer branch as long as apical pigmented sclerite; median piece of tegmen parallel-sided in basal part, with one oblique process arising from base of apical curving which occupies apical 1/3 of median piece of tegmen; side of median piece gently and simply tapering apicad without constriction.

Female. Unknown.

Differential diagnosis. This species resembles *V. duodecimguttata* (Poda, 1762) and *V. luliangensis* Cao & Xiao, 1984 by the apex of the siphon. However, it should be distinguished from *V. duodecimguttata* by the oblique process of median piece of the tegmen. Furthermore, it should be distinguished from *V. luliangensis* by the gently tapering sides of median piece of the tegmen. This species is variable in ventral maculation, some specimens have a whitish prosternum and mesocoxal process of the metasternum.

Etymology. The specific epithet is dedicated to Yuto Fukuda.

***Vibidia saitoi* sp. nov.**

(Figs. 3, 8, 9)

Type material. Holotype (♂): Tashiro, Aoiku, Shizuoka, Japan, 15.VII.2017, M. Asano leg. Paratypes: (1 spec.): same data as holotype; (1 spec.): Kuttari, Tomuraushi, Shintokucho, Hokkaido, 43°27'35"N, 142°52'20"E, alt. ca. 664-880 m, 23.VI.2017, Y. Fukuda leg.; (1 spec.): Magikeikoku, Ootacho, Akita, 14.VII.1992; (1 spec.): Agatumamachi, Gunma, 9-11.VIII.1993, Y. Kaneko det.; (1 spec.): Mt. Aobasan, Takahamacho, Fukui, 5.V.1978, M. Saito leg.; (1 spec.): Mt. Fujiwara, Inabeshi, 11.VI.2016, T. Ichyanagi leg.; Kanayamadani, Kumakougencho, 19-20.VIII.2010, R. Nitta leg.

Description. Male. Body large, 3.2-3.5 (3.5) mm in length, 2.7-2.8 (2.8) mm in width. Color orange brown; head, mesepimeron, and metepisternum brownish white; external margin of pronotum and elytra translucent; lateral part of pronotum with two brownish white spots or one confluent spot; elytron with 6 dull white spots; elytral spots often becoming

smaller. Integument glabrous. Head concealed by pronotum, flat on disc, shallowly punctate, emarginate at antennal insertion; clypeus truncate, rounded at lateral corners; interval of eyes as wide as labrum; eye coarsely and granularly faceted; transverse ridge of eye broad, situated dorsally; antenna 11-segmented, longer than head width; scape tumid, elongate; pedicel moniliform, smaller than scape; flagellum filiform; club weakly serrate, composed of three segment; terminal segment elongate oval; mandible bifid, coarsely serrate at external margin. Pronotum transverse, weakly convex above, densely and finely punctate, weakly emarginate at anterior margin; punctures denser than those of elytra; each corner rounded. Elytra weakly convex above, explanate laterally, finely punctate; explanate area relatively narrow, tapering apicad. Epipleuron of pronotum weakly concave. Prosternum without carina. Anterior margin of mesosternum weakly arcuate. Metasternum convex below at posterior area. Legs: tibiae slender, simple, without apical spurs; claws with basal quadrate appendix; appendix half times as long as claws. Abdomen: first exposed sternite with weakly impressed femoral lines, 1.5 times as long as second; sixth sternite emarginate at posterior margin. Male genitalia: siphonal apex with translucent flagellum and well pigmented sclerites; outer sclerite weakly recurved; inner one strongly recurved; inner branch of siphonal capsule slightly smaller than outer branch; outer branch as long as apical pigmented sclerites; median piece of tegmen parallel-sided in basal part, with one oblique process arising from base of apical curving which occupies apical 1/3 of median piece of tegmen; side of median piece gently and simply tapering apicad without constriction.

Female. Not identified.

Differential diagnosis. This species resembles *V. korschefskii* (Mader, 1930) in the siphonal apex (Shenchang Xiangwen & Baohai 2013). However, this species has the process arising from the base of apical curving occupying 1/3 of median piece of tegmen, and a small siphonal capsule as long as outer apical flagellum of siphon. While the latter has the process arising from the base of apical curving which occupies 1/2 of median piece of tegmen, and the siphonal capsule longer than outer apical flagellum. Some of this species have smaller elytral spots. These spots might be useful to distinguish the species from *V. fukudai*.

Etymology. The specific epithet is dedicated to Masahiro Saito.

***Thea* Mulsant, 1846**

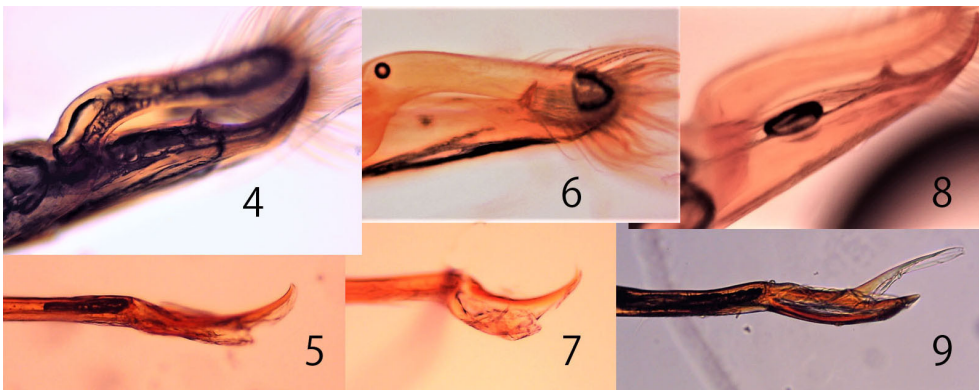
Thea cincta (Fabricius, 1798) and *Thea duodecimguttata* (Poda, 1762) were recorded by Crotch (1874) from Japan. They might correspond to *Kihiro koebelei* (Timberlake, 1943) and *Vibidia* spp. respectively. I have examined no specimen belonging to this genus collected in Japan.

***Kihiro* Kitano, 2014**

It contains many species previously belonging to *Illeis*. Members of this genus are distinguished one from another by the male genitalia. According to Anand, Gupta & Ghai



Figs. 1-3. Habitus: 1- *Halyzia ichiyanaigii* sp. nov.; 2- *Vibidia fukudai* sp. nov.; 3- *Vibidia saitoi* sp. nov.



Figs. 4-9. Male genitalia; figs. 4, 6, 8. Tegmen; figs. 5, 7, 9. Apex of sipo: 4, 5- *Vibidia duodecimguttata*; 6, 7- *Vibidia fukudai* sp. nov.; 8, 9- *Vibidia saitoi* sp. nov.

(1990), *Illeis kapuri* Anand, Gupta & Ghai 1990 is rather different from other members. Then, it should be excluded from this genus by having the moderately dilated terminal segment of maxillary palpi and the appendix of the siphonal apex of male genitalia. It might belong to *Thea* or *Vibidia*.

Psyllobora Chevrolat, 1837

Psyllobora vigintimaculata (Say, 1824) is the only species of this genus present in Japan, but many species occur in South America. There are insufficient specimens to define characters of this genus. The characters of the eye and prosternum might be important for this purpose.

KEY TO TRIBES OF COCCINELLIDAE OCCURRING IN JAPAN AND NEIGHBORING AREAS

1. Anterior part of eye broadly developed, fused with clypeus, confluent prominent forward, without constriction between transverse ridge of eye and clypeus 2
- Anterior part of eye not developed in many genera or developed in some genera of *Epilachnini* Mulsant, 1846 and *Corystes* Mulsant, 1850; interval between transverse ridge of eye and clypeus constricted 5
2. Antennal insertion visible in lateral view. Penultimate segment of antenna larger than adjacent segments. Maxilla large; maxillary palpi slender, geniculate; terminal segment and antepenultimate segment of maxillary palpi elongate, longer than penultimate segment. Prosternum with large elevated area; anterior area depressed Shirozuellini Sasaji, 1967
- Antennal insertion not visible in lateral view, arising from ventral surface of head. Penultimate segment of antenna moderate in size. Maxilla moderate in size; maxillary palpi normal; terminal segment longer than any remaining segment; each of the remaining segments rather short 3
3. Interval between posterior corner of prosternum and elytral base relatively wide; posterior corner of pronotum widely rounded, reduced, or moderately developed, placed in lateral side of anterior corner; posterior margin of pronotum forming long arch. Inner margin of mandibles deeply emarginate. Interval between mesocoxae narrower than width of mesocoxa. Elytra with broad explanate area Chirocorini Mulsant, 1846
- Interval between posterior corner of prosternum and elytral base relatively narrow; posterior corners of pronotum narrowly rounded to bluntly pointed, posterior margin of pronotum moderately arcuate. Inner margin of mandible moderately constricted, not emarginate. Interval between mesocoxae wider than width of mesocoxa, or as wide as it. Elytra without explanate area, or with narrow explanate rea 4
4. Mandible bifid, cleft at apex; two apical processes overlapping. Antennal second segment tumid, as long as first. Cardo moderately to widely elongate. Prosternum large; prosternal process long, slender, with carina; lateral part largely exposed. Interval between mesocoxae as wide as width of mesocoxa; border between mesosternum and metasternum normal. Tibiae moderately to strongly explanate, angulate externally. Fifth visible sternite as long as sixth. Head transverse; eyes widely separated. Body pubescent Platynaspini Mulsant, 1846
- Mandible bifid; two apical processes separated. Antennal second segment small, shorter than first. Cardo moderate in width. Prosternum short, small; prosternal process short, broad; lateral part largely concealed by foretibia. Interval between mesocoxae as wide as width of mesocoxa, or wider than it; border between mesosternum and metasternum often reduced. Tibiae slender to moderately broad. Fifth visible sternite twice as long as fourth; sixth hardly visible. Body pubescent to glabrous. Telsimiini Casey, 1899
5. Antenna with large, elongate, abrupt, and oval club. Interval between maxillae narrow; basal part of labium slender. Body minute to small. Antennal insertion exposed dorsally. Eye coarsely and granularly faceted. Basal part of inner margin of mandibles not angulate. Maxillary palpi geniculate; terminal segment and antepenultimate segment of maxillary palpi elongate, longer than penultimate segment; terminal segment elongate, tapering apicad. Mesocoxae moderately to widely separated; interval as wide as width of mesocoxa or wider than it 6
- Antenna with indistinct club or large circular terminal segment. Interval between maxillae moderately separated; labium and basal part of labium moderate in width 8
6. Anterior area of head short, not elongate. Antennal club composed of one segment; terminal segment of antenna large, elongate oval, as long as the remained segments of flagellum combined. Prosternum with large elevated central area; anterior part of prosternum widely protruding forward. Body glabrous to sparsely pubescent. First visible sternite and terminal sternite large; each of segments between them rather short Serangiini Blackwelder, 1945

- Anterior area of head normal to elongate. Antennal club composed of two or three segments. Prosternum with small elevated area on center. Anterior part of pronotum not protruding forward, or narrowly protruding forward..... 7
- 7. Prosternum with narrowly elevated central area arising from anterior margin to tip of coxal process; lateral area depressed, strongly reduced..... Sukunahikonini Kamiya, 1960
- Prosternum with T-shaped elevated area; coxal process with carina not reaching anterior margin of prosternum..... Microweiseini Leng, 1920
- 8. Mandible multidentate; inner margin without angulate mola. Antenna long; antennal insertion exposed dorsally. Interval between mesocoxae narrower than width of mesocoxa. In many genera body highly convex above, densely pubescent, orange with black spots..... Epilachnini Mulsant, 1846
- Mandible bifid. In many genera angulate mola confirmed..... 9
- 9. Tarsi not dilated below..... 10
- Tarsi dilated below. Body pubescent..... 11
- 10. Body moderate in size, elongate oval. Antenna long. Mesocoxae moderately separated; interval as wide as mesocoxa..... Litophilini Imhoff, 1856
- Body minute, short oval. Antenna short. Mesocoxae widely separated; interval wider than mesocoxa; border between mesosternum and metasternum invisible..... Limnichopharini Miyatake, 1994
- 11. Terminal segment of antenna large and circular. Pronotum with lateral sulcus apart from lateral margin. Body pubescent..... Monocoryni Miyatake, 1988
- Terminal segment of antenna small to intermediate in size. Pronotum without sulcus apart from lateral margin..... 12
- 12. Antepenultimate segment of antenna large, longer than adjacent segments. Scutellum large. Elytral epipleura with depression for receiving legs. Body small, glabrous. Eye finely faceted..... Hyperaspini Mulsant, 1846
- Antepenultimate segment of antenna longer as long as adjacent segments. Scutellum of intermediate to small size..... 13
- 13. Undersurface of head largely concealed by prosternum..... 14
- Undersurface of head largely exposed..... 15
- 14. Anterior area of prosternum extending forward across the full width; anterior margin straight, concealing undersurface of retracted head. Dorsal surface of head largely exposed. First segment of antenna moderate in size, not strongly protruding forward. Eye finely faceted; transverse ridge moderate in size. Antennal insertion moderate in size, exposed dorsally. Maxilla moderate in size, half times as long as head. Undersurface of head normal, without depression..... Cryptolaemini Mulsant, 1853
- Lateral area prosternum extending forward; anterior margin of prosternum arcuately emarginate. Dorsal surface of head hardly visible, concealed by pronotum. First segment of antenna large, arcuately protruding forward. Eye coarsely faceted; transverse ridge long. Antennal insertion large, exposed dorsally. Maxilla large, longer than half the length of head. Undersurface of head strongly depressed around maxilla..... Sumniini Hoang, 1982
- 15. Elytral epipleuron short, narrow; apex reaching basal half of abdominal side. Antenna shorter than head width; most of segments short, transverse, closely articulated..... 16
- Elytral epipleuron long, narrow to broad; apex reaching apical half of abdominal side. Antenna short to long; in many genera most of segments slender; loosely articulated..... 19
- 16. Abdominal femoral line separated from posterior margin of first abdominal sternite..... 17
- Abdominal femoral line reaching posterior margin of first abdominal segment..... 18
- 17. Anterior margin of pronotum arcuately protruding apicad to conceal mouthparts. Eye coarsely to moderately faceted..... Stethorini Dobzhansky, 1924
- Anterior margin of pronotum not protruding apicad; mouthparts exposed. Eye moderately to finely faceted... Scymnini Mulsant, 1846
- 18. Body hemispherical to oval in dorsal view, highly convex above. Antennal insertion exposed on dorsal surface of head; clypeus emarginate to receive antennal insertion. Transverse ridge of eye long; basal part thin. Femora broad, concealing tibia. Abdominal sternite flat; first visible sternite arcuate at posterior margin; sixth exposed abdominal sternite as long as fifth..... Aspidimerini Mulsant, 1850
- Body oval, weakly to moderately convex above. Femora normal. Abdominal sternites normal..... Diomini Gordon, 2000

19. Transverse ridge of eye reduced, not exposed dorsally. Antenna short. Interval between mesocoxae narrow. Prothorax short; prosternum with small elevated area on center; lateral part narrow, depressed. Eye densely pubescent. Tibia angulate externally Noviini Mulsant, 1850
 - Transverse ridge of eye distinct, placed in anterior to dorsal area of eye. 20
20. Prosternum with broad central area surrounded by ridges reaching anterior margin; central area subparallel-sided to divergent forward. Mesocoxae widely separated in many genera..... 21
 - Prosternum without complete ridge reaching anterior margin, or with central area surrounded by ridges convergent forward 22
21. First of antenna well tumid. Antennal club distinct, composed of four or five segments. Anterior margin of prosternum protruding apicad, with cavity for receiving mouth parts. Maxillary palpi slender, geniculate; terminal segment and antepenultimate segment of maxillary palpi elongate, longer than penultimate segment; terminal segment weakly dilated. Femoral line of abdomen arcuate, complete, or composed of inner line running from base to apex of first sternite and outer associate line Plotinini Miyatake, 1994
 - First segment of antenna relatively slender. Antennal club faintly dilated, composed of three segments. Terminal segment of maxillary palpi slender, conical to weakly dilated. Antepenultimate segment of maxillary palpi moderate or long. Femoral line of abdomen incomplete Sticholotidini Weise, 1901
22. Mesocoxae widely separated. Anterior margin of metasternum between mesocoxae weakly produced anteriorly. Body pubescent 23
 - Mesocoxae narrowly separated. Anterior margin of metasternum between mesocoxae strongly produced anteriorly. Body pubescent or not..... 24
23. Eye finely faceted; transverse ridge small. Lateral carina of pronotum absent or weakly impressed. Ortaliini Mulsant, 1850
 - Eye coarsely and granularly faceted; transverse ridge moderate in size. Antenna long. Lateral carinae of pronotum distinct Coccidulini Mulsant, 1846
24. Body pubescent..... Singhikaliini Miyatake, 1972
 - Body glabrous 25
25. Eye finely faceted. Mandible bifid, smooth at margin. Terminal segment of labial palpi slender, conical. Anterior area of pronotum pigmented. Terminal segment of maxillary palpi weakly to moderately dilated Coccinellini Latreille, 1807
 - Eye coarsely and granularly faceted. Mandible bifid, serrate along ventral margin; serration often abraded. Terminal segment of labial palpi tumid, pyriform. Anterior area of pronotum translucent. Terminal segment of maxillary palpi moderately to strongly dilated..... Halyziini Mulsant, 1846

Taxonomical studies on tribes of Asian Coccinellidae were published by Kapur (1947), Miyatake (1961, 1988, 1991, 1994), and Sasaji (1967, 1968). Sasaji (1968, 1971) defined some subfamilies. At this point, I was unable to classify all the tribes into subfamilies. I assume that Coccidulinae consist of Coccidulini, Sumniini, Lithophilini, and Monocoryni, but these tribes are separated in the key. I omitted *Leptoscymnus* Iablokoff-Khnzorian, 1978 originally contained in Scymnini. This genus looks unique in Coccinellidae by the serrate three-segmented antennal club. It might belong to Scymnini by having a large elongate antennal first segment, short prosternum, widely separated mesocoxae, and complete abdominal femoral line. Sumniini Hoang, 1982 might be a junior synonym of Exoplectrini Crotch, 1874. Members of *Sumnius* have many characters of Exoplectrinae referred by Gordon (1994). Kovář (2007) directly contained *Sumnius* in Exoplectrinae without specifying the tribe. Photos (Escalona & Ślipiński 2012) of *Microfreudea* Fürsch, 1985 originally contained in Microweiseini show that the genus has many characters of Serangiini. If the key is applied to the genus, it belongs to Serangiini together with *Paracoelopterus* Normand, 1936. Carinodulini Gordon, Pakaluk & Ślipiński, 1989 omitted here is distinguished from all the tribes by the peculiar body shape and many sculptures on the integument.

KEY TO GENERA RELATED TO HALYZIINI OCCURRING IN JAPAN AND NEIGHBORING AREAS

1. Transverse ridge of eye small and indistinct. Prosternum short; anterior margin of prosternum deeply emarginate; lateral part of prosternum strongly sinuate, protruding forward. Body small, 2.0 mm in length. Siphon with elongate apex. Spermatheca extremely long *Psyllobora vigintimaculata* Say, 1824
- Transverse ridge of eye large. Prosternum moderate in length 2
2. Anterior margin of pronotum almost straight 3
- Anterior margin of pronotum emarginate 4
3. Terminal segment of maxillary palpi strongly dilated; apical margin weakly arcuate. Eye large.....
- *Macroilleis* Miyatake, 1965
- Terminal segment of maxillary palpi moderately dilated; inner side shorter than outer side; apical margin obliquely subtruncate. Eye normal in size..... *Halyzia* Mulsant, 1846
4. Dorsal surface of head almost concealed by pronotum. Elytra immaculate..... *Kiirō* Kitano, 2014
- Dorsal surface of head largely exposed..... 5
5. Body orange with whitish spots in dorsum. Spermatheca branched at base *Vibidia* Mulsant, 1846
- Body yellow with black spots in dorsum. Spermatheca not branched..... *Thea* Mulsant, 1846

Scymnini Mulsant, 1846

Scymnus (s. str.) *yotsuhoshi* Kitano, 2012

This species was put into the subgenus *Neopullus* Sasaji, 1971 in the original description. However, it should be transferred to the nominotypical subgenus of *Scymnus* Kugelann, 1794 by having the indistinct femoral line of abdomen and classed into the group *S. frontalis* (Canepari, 1983) by the male genitalia.

ACKNOWLEDGEMENT. I would like to express my appreciation to Takashi Ichiiyanagi, Takashi Kurihara, Junsuke Yamasako, Jiro Ogawa, Atsushi Imai, Susumu Matsuo, Ryohei Nitta, Yoshiki, Okahana, Nobuo Ohbayashi, Minoru Tanaka, Kentaro Toyoshima, Masahiro Saito, Makoto Asano, Yuusuke Sakamoto, Yuto Fukuda, Andreas Pütz, Claudio Canepari for providing me with materials studied here. I am grateful to C. Canepari for the suggestion on *S. yotsuhoshi*.

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Received: 30.4.2019

Accepted: 20.5.2019

Printed: 5.10.2019