A Review of the Genus *Haplosomoides* Duvivier, 1890 in Taiwan and Japan (Coleoptera: Chrysomelidae: Galerucinae)

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Species of the genus *Haplosomoides* Duvivier in Japan and Taiwan are reviewed taxonomically. Four new species, *Haplosomoides chengi* sp. nov., *H. changi* sp. nov., and *H. tsoui* sp. nov. from Taiwan and *H. ryukyuensis* sp. nov. from Japan are described. Two known species are redescribed: *H. miyamotoi* Kimoto and *H. abdominalis* Kimoto. Their allied species, *H. costata* (Baly) and *H. annamita* (Allard) are also redescribed for comparison. A key to the species of *Haplosomoides* in Japan and Taiwan and their allied species is provided.


Key words: Taxonomy, New species, Leaf beetles.

*Haplosomoides* Duvivier, 1890 is distributed mainly in the Oriental region but some species also occur in the southeastern part of the Palaearctic region (Nepal, South China, Taiwan, and Japan). Most members of the genus exhibit secondary sexually dimorphic characters, such as the length of the antennae, sizes of the eyes, tibiae, and tarsi, the presence of an appendage on abdominal sternite I, and the shape of abdominal sternite V. Although some species have simple male genitalia, they can still be distinguished by their sexually dimorphic characters.


Some species of *Haplosomoides* were reported from Taiwan and Japan. *Haplosomoides costata* (Baly) was recorded from Taiwan by Weise (1922), then from Ishigaki I., Japan by Miwa (1933). *Haplosomoides miyamotoi*, a new species from Amami-Oshima, Japan, was described by Kimoto (1965). A 3rd species, *H. abdominalis*, was described by Kimoto (1984) from Taiwan. At the same time, *H. annamita* (Allard) was also recorded from Taiwan (Kimoto 1984). Both *H. costata* and *H. annamita* were spelled using the masculine form by Kimoto.

The Taiwan Chrysomelid Research Team (TCRT) was founded to inventory all species of Chrysomelidae in Taiwan. Over the course of

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investigating the chrysomelids of Taiwan, it was noted that *H. abdominalis* displayed morphological diversity between populations, and 1 allied sympatric species was found in southern Taiwan. This indicated that *Haplosomoides* should be reviewed taxonomically. In the present study, more than 600 specimens were examined and the results are presented.

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The gender of *Haplosomoides* is confusing because different authors treated species of this genus as different genders. Mohamedsaid (1994 2001 2007) and Kimoto (1965 1966 1984 1985 1989a) treated species of the genus as masculine, while they were regarded as feminine by others. However, they should be regarded as feminine because the type species *H. serena* clearly has a feminine meaning. Beenen (2010) listed the Palearctic species of the genus as feminine.

**MATERIALS AND METHODS**

Recent and historical collections at the Taiwan Agricultural Research Institute, Wufeng, Taiwan were examined; these include some materials collected by the TCRT. Because most old specimens in Taiwan were labeled with names of collecting sites translated from the Japanese, they were translated into modern names based on Chu and Yamanaka (1973). Types and specimens available for the present study are deposited in the following collections: BMNH, The Natural History Museum (former British Museum), London, UK; EIHU: Hokkaido Univ., Sapporo, Hokkaido, Japan; EUMJ: Ehime Univ., Matsuyama, Japan; FKCC, František Kantner collection, České Budějovice, Czech Republic; JBCB: Jan Bezdík collection, Brno, Czech Republic; JVCJ, Jiří Volfíšek collection, Jirkov, Czech Republic; KMNH: Kitakyushu Museum of Natural History and Human History, Kitakyushu, Japan; KUEC: Faculty of Agriculture, Kyushu Univ., Fukuoka, Japan; NMNS: National Museum of Natural Science, Taichung, Taiwan; NMNH: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA; TARI: Taiwan Agricultural Research Institute, Wufeng, Taiwan.

To prepare drawings of the adult reproductive systems, the abdomens of adults were separated and boiled in a 10% KOH solution, cleared in distilled water, and then mounted on slides with glycerin. Specimens were examined and drawings were made using a Leica M165 stereomicroscope (Singapore). Microscopic slides were examined and illustrated using a Nikon ECLIPSE 50i microscope (Kyoto, Japan).

The following abbreviations were used in this paper: LP, pronotal length, WP, pronotal width, LE, elytral length, and WE, elytral width. Host plants were recorded during the course of the present study, and identified by Chih-Kai Yang (National Taiwan University, Taipei).

**SYSTEMATIC ACCOUNTS**

*Haplosomoides costata* group

Diagnosis: Elytral carinae quite sharp and distinct; with an additional sharp ridge rising from humerus. Abdominal sternite I with 1 longitudinal appendage in males. Eyes dimorphic sexually, eyes of males much larger than those of females.

*Haplosomoides chengi* sp. nov.

(Figs. 1-4, 9-14, 27)

*Mimastra costata* Weise, 1922: 75 (Kanshirei = Kuantyling, in Tainan, Taiwan); Miwa 1931: 190 (Taihorin = Tailin, in Chiayi; Kankau = Hengchun, in Pingtung; Sokutsu, near Chiasien, in Kaoshiung; Maruyama = Yuanshan, in Taipei, Taiwan).

*Haplosomoides costatus*: Chûjô 1935c: 163 (list); Chûjô 1962: 216 (Daibu = Tawu, in Taitung); Chûjô 1963: 391 (Kanshirei, Chikutoge = Chuchi, in Chiayi; Kosempo = Chiasien, in Kaoshiung; Taihorinshô = Tailin, in Chiayi, Taiwan); Chûjô 1965: 96 (Jitsugetsu-tan = Jihyuetan, in Nantou, Taiwan); Kimoto 1966: 28 (Taihorin; Zentai = Chietapu, in Tailin, Taiwan); Kimoto 1969: 35 (Yangmingshan and Pinglin, in Taipei; Puli, Meichi, Penpuchi, Jiuyuehtan, Nanshan, Sungkang, and Chuchi in Nantou; Chihsinliao and Kuantzuling, in Tainan; Juisui, in Hualien; Chîrifu, in Kaoshiung, Chulu, in Taitung; Kenting and Kueitzuchiao, in Pingtung, Taiwan); Kimoto 1989a: 251 (Sha Ping, Tai Yuan Shan, Chih Nan Shan, Too Nah, in Kaohsiung, Taiwan); Kimoto 1991: 11 (Liu Kui, Wu Kon Shan, Ta Yuen Shan, Pa Yun Shan, Sha Ping, Tsai Tie Ku, and Too Nah, in Kaohsiung, Taiwan); Takizawa et al. 1995: 10 (Miantianshan, in Taipei; Shapaling, in Taoyuan; Nanshanchi, Lienhuachih, and Chinai, in Nantou; Liukuei, in Kaohsiung, Taiwan).

Type material (284 specimens): Holotype $\delta$: Taiwan: Taipei, Taishan, 24 Apr. 2009, leg. H.-T. Cheng (TARI); paratypes, 1 $\delta$, 1 $\varphi$, same data as for holotype (TARI); 3 $\varphi$, Taihoku (= Taipei), 13
May 1932, leg. M. Chûjô (TARI); 1 ♀, same but with 5 May 1931 (TARI); 1 ♂, same locality, 31 July 1934, leg. Y. Miwa (TARI); 1 ♀, same locality, 25 May 1940, leg. S. Miyamoto (TARI); 1 ♀, same locality, 8 May 1941, leg. T. Kageyama (TARI); 1 ♂, same locality, 3 June 1948, leg. C.T. Lin (TARI); 1 ♂, same locality, 19 Apr. 1949, leg. K.S. Lin (TARI); 1 ♂, 1 ♀, same locality, 31 Apr. 1949, leg. S.C. Chiu (TARI); 1 ♂, Taipei, Hsinhtien (= Sinten), 14 June 1940, leg. S. Miyamoto (TARI); 1 ♀, same locality, 9 July 1963, leg. K.H. Liu; 14 ♂ ♂, 5 ♀ ♀, Taipei, Tiennu, 7 Apr. 1956, leg. S. C. Chiu (TARI, EUMJ); 2 ♀ ♀, Taipei, Tingpeitou, 22 Apr. 1956, leg. K.S. Lin (TARI); 4 ♂ ♂, 1 ♀, Taipei, Hokutô (= Peitou), 2 June 1940, S. Miyamoto (TARI); 1 ♀, Taipei, Linkou, 23 May 2007, leg. H.-H. Han (TARI); 1 ♂, Taipei, Sushoushan, 2 May 2008, leg. H.-J. Chen (TARI); 1 ♂, Taipei, Hushan, 27 May 2004, leg. H.-T. Cheng (TARI); 1 ♂, same but with 11 May 2003 (TARI); 1 ♂, Taipei, Fushan, 11 May 2009, leg. H.-J. Chen (TARI); 1 ♀, Taipei, Wulai, 7 July 2007, leg. S.-F. Yu (TARI); 1 ♀, same locality, 17 May 2008, leg. M.-H. Tsao (= Tsou) (TARI); 1 ♀, Taipei, Maokung, 29 May 2008, leg. S.-F. Yu (TARI); 1 ♂, Taipei, Sôzan (= Yangmingshan), 7 May 1939, leg. Y. Miwa (TARI); 1 ♂, same locality, 24 May 1942, leg. M. Chûjô (TARI); 1 ♂, 2 ♀ ♀, Taipei, Shoeiyuandih, 19 Apr. 1949, leg. K.S. Lin (TARI); 1 ♂, Hsinchu, Chikuto (= Chutung), 28 Mar. 1930, leg. T. Shiraki (TARI); 3 ♀ ♀, Hsinchu, Kuansu, 19 May 1964, leg. H.H. Cheng (TARI); 1 ♂, Miaoli, Sani, 14 Apr. 2009, leg. W.-T. Liu (TARI); 40 ♂ ♀, 6 ♀ ♀, Taichung, Tatu, Juiching Village, 24 Apr.-30 May 2006, leg. C.S. Lin and W.T. Yang (NMNS); 1 ♀, Taichung, Kaho(o)daï (= Chiapaotai), 5 June 1935, leg. R. Takahashi (TARI); 1 ♂, Changhua, Nisui (= Erhshueh), June 28, leg. Issiki (TARI); 1 ♀, Nantou, Baibara (= Meinuyan), 4-7 July 1939, leg. Y. Miwa (TARI); 1 ♀, Nantou, Chunyang, 9-Jul. 3 May 2002, leg. C.S. Lin and W.T. Yang (NMNS); 8 ♂ ♂, 3 ♀ ♀, same but with 7-11 May 2002 (NMNS); 1 ♂, 1 ♀, same but with 11 May-13 July 2004 (NMNS); 2 ♀ ♀, same but with 13 July-10 Aug. 2004 (NMNS); 1 ♀, Nantou, Lienhuachih, 3 June 2009, leg. C.-F. Lee (PANG (TARI); 1 ♂, 2 ♀ ♀, same locality, 23-25 May 980, leg. K.S. Lin and B.H. Chen (TARI); 1 ♂, Nantou, Horisha (= Puli), May-Aug. 1918, leg. Kawamura (TARI); 1 ♂, same locality, collector unknown, 28 Apr. 1919 (TARI); 3 ♂ ♂, 2 ♀ ♀, same locality, 16-19 May 1956, leg. K.S. Lin (TARI); 1 ♀, Nantou, Puli Yuchih, Sun Moon Lake, 29 May-13 June 1993, leg. J. Dalhod (JVCJ); 2 ♂ ♂, Nantou, Musha (= Wushe), 18 May-15 June 1919, leg. T. Okuni (TARI); 1 ♂, same locality, 19-23 June 1979, leg. K.S. Lin and B.H. Chen (TARI); 1 ♂, 1 ♀, same locality, 8 Oct. 1980, leg. C.C. Chen and C.C. Chien (TARI); 4 ♂ ♂, 2 ♀ ♀, same locality, 6-11 May 1981, leg. K.S. Lin and S.C. Lin (TARI); 2 ♀ ♀, same locality, 7 May 1984, leg. K.C. Chou and C.C. Pan (TARI); 1 ♂, 4 ♀ ♀, Nantou, Tungpu, 20-22 June 1980, leg. C.C. Chen (TARI); 2 ♂ ♂, 1 ♀, same locality, 28 Apr.-2 May 1981, leg. T. Lin and C.J. Lee (TARI); 1 ♀, same locality, 19-23 July 1982, leg. L.Y. Chou and T. Lin (TARI); 1 ♀, same locality, 20-24 June 1983, leg. K.C. Chou and C.Y. Wong (TARI); 1 ♀, Nantou, Meifeng, 22 May 1982, leg. L.Y. Chou (TARI); 1 ♂, 1 ♀, Nantou, Tsuifeng, 8 May 1981, leg. K.S. Lin and S.C. Lin (TARI); 4 ♀ ♀, Nantou, Lushan, 27-31 May 1980, leg. K.S. Lin and L.Y. Chou (TARI); 1 ♀, Nantou, Takeya (= Chushan), 8 July 1940, leg. M. Chûjô (TARI); 2 ♂ ♂, Chiai, Shonoryo (= Channaoiliao), 30 Apr. 1931, leg. T. Shiraki (TARI); 1 ♀, Chiai, Takezaki (= Chuchi), 3 May 1931, leg. T. Shiraki (TARI); 2 ♀ ♀, Chiai, Taihorin (= Talin), 7 Aug. 1911, leg. H. Sauter (TARI); 1 ♀, same locality (Taihorinsho), Sept. 1909, leg. Sauter (NMNS); 1 ♂, Chiai, Iwaiyama (= Chushan), 6 Aug. 1940, leg. K. Endo (TARI); 1 ♂, 2 ♀ ♀, Tainan, Kuanyuling, 11 May 1952, leg. Nitobe (TARI); 3 ♀ ♀, same locality (= Kanshires), 13 May 19??, leg. Y. Miwa (2 with unknown collectors) (TARI); 7 ♂ ♂, 5 ♀ ♀, Tainan, Chingshan, 18 Apr. 1992, leg. C.Y. Li (NMNS); 1 ♀, Kaohsiung, Koseampo (= Chiasien), June 1909, leg. Sauter (NMNS); 1 ♀, Kaohsiung, Liu-kuei, 27-28 June 1981, leg. L.Y. Chou and C.H. Yang (TARI); 5 ♂ ♂, 6 ♀ ♀, Kaohsiung, Meishan, 12 June 2008, leg. F. and L. Kantner (FKCC, JBCB); 1 ♀, same locality, 11 June 2008, leg. J. Voříšek (JVCJ); 2 ♀ ♀, Pingtung, T(D)ahanhsian, 18 July 2007, leg. C.-F. Lee (TARI); 1 ♀, same locality and date, leg. M.-H. Tsao (TARI); 5 ♀ ♀, same locality, 20 July 2007, leg. C.-F. Lee (TARI); 2 ♀ ♀, same locality and date, leg. M.-H. Tsao (TARI); 2 ♂ ♂, 1 ♀, same locality, 25 May 2008, leg. C.-F. Lee (TARI); 1 ♀, same locality, 4 July 2008, leg. M.-H. Tsao (TARI); 9 ♂ ♂, 2 ♀ ♀, Pingtung, Shantimen, 28-Mar.-1 Apr. 1981, leg. C.C. Chen and C.C. Pang (TARI); 2 ♂ ♂, 1 ♀, same locality, 24 Mar. 1982, leg. K.C. Chou and C.C. Pan (TARI); 3 ♂ ♂, 2 ♀ ♀, Pingtung, Kuraru (= Kenting), 28 Mar. 1935, leg. M. Chûjô (TARI); 1 ♀, same locality, 28 June 1929, leg. R. Takahashi (TARI); 1 ♂, same locality, 26 Apr. 1992, leg. C.Y. Li (NMNS); 4 ♂ ♂, same locality, 22-26 Mar. 1982, leg. T. Lin and S.C. Lin (TARI); 1 ♂, 1 ♀, Pingtung, Koshun (= Hengchun), 25 Apr.-25 May 1918, leg. J. Sonan (TARI); 1 ♀,
same but with 11 June 1937 (TARI); 1 ♀, same 
but with 13 June 1937 (TARI); 1 ♀, same locality, 
13-17 June 1994, leg. J. Lorenc (JVCJ); 1 ♂, 
5 ♀♂, 8-15 km NE of Hengchun, 16-20 June 
2008, leg. F. and L. Kantner (FKCC, JBCB); 3 ♀♀, 
Pingtung, Kusukusu (= Kaoshih), 17 June 1937, 
leg. M. Chûjô (TARI); 1 ♀, Pingtung, Raisha 
(= Laiyi), 26 July 1935, leg. Y. Miwa (TARI); 1 ♀, 
same but with 27 July 1935 (TARI); 1 ♀, same 
locality, 18 May 1941, collector unknown (TARI); 
T. Lin and S. C. Lin (TARI); 1 ♂, same but with 24 
Mar. 1982 (TARI); 3 ♀♀, same locality, 25-28 May 
1982, leg. K.C. Chou and C.C. Pan (TARI); 1 ♀, 
same but with 12-13 Mar. 1984 (TARI); 1 ♂, same 
but with 16 Mar. 1984 (TARI); 1 ♂, 1 ♀, Taitung, 
Chipon (= Chipen), 25 Mar. 1935, leg. M. Chûjô 
(TARI); 1 ♀, Taitung, Tyokakurai, Daibu (= Tawu), 
26 July 1936, collector unknown (NMNS); 2 ♀♀, 
Karenko (= Hualien City), 20 July-4 Aug. 1919,


Male: Length 5.8-6.4 mm, width 2.2-2.5 mm. Color yellowish-brown (Figs. 1, 2); antennae blackish-brown, 2 or 3 basal antennomeres paler; elytra black. Eyes prominent, distance between eyes much narrower than diameter of eye. Antennae filiform and long (Fig. 9), about 0.9x length of body. Pronotum quadrilateral, slightly widened anteriorly, surface moderately depressed behind middle; WP/LP = 1.62-1.67. Elytra elongate (EL/WL = 2.01-2.09), moderately widened near apex; with a sharp ridge rising from humerus, abbreviated near apex; and an additional ridge.

Male: Length 5.8-6.4 mm, width 2.2-2.5 mm. Color yellowish-brown (Figs. 1, 2); antennae blackish-brown, 2 or 3 basal antennomeres paler; elytra black. Eyes prominent, distance between eyes much narrower than diameter of eye. Antennae filiform and long (Fig. 9), about 0.9x length of body. Pronotum quadrilateral, slightly widened anteriorly, surface moderately depressed behind middle; WP/LP = 1.62-1.67. Elytra elongate (EL/WL = 2.01-2.09), moderately widened near apex; with a sharp ridge rising from humerus, abbreviated near apex; and an additional ridge.
also arising from humerus, running between suture and sharp ridge. All tibiae straight. Front and middle tarsomeres I normal (Fig. 12). Abdominal sternite I with a longitudinal appendage (Figs. 11A, B) extending from middle of posterior margin, apex slightly swollen and bent upwards, ventral surface with dense, short setae from apical 1/3 to apex, lateral margin with a row of long setae. Abdominal sternite V with straight apical margin. Genitalia (Figs. 13A, B) short and slightly curved, apically pointed, apex slender in lateral view.

**Female:** Length 6.4-7.6 mm, width 2.9-3.2 mm. Similar to male (Figs. 3, 4) but eyes relatively smaller, distance between eyes wider than diameter of eye. Antennae filiform, subequal to male’s in length (Fig. 10), but relatively shorter in comparison to body size, about 0.7x length of body size. Pronotum quadrilateral, slightly widened anteriorly, surface moderately depressed behind middle; WP/LP = 1.57-1.62. Elytra wider than male’s (LE/WE = 1.84-1.90). Abdominal sternite I without appendages. Spermathecal cornu wide and strongly recurved (Fig. 14); nodulus long, a little narrower than cornu; proximal spermathecal duct long and very narrow.

**Diagnosis:** This new species is similar to *H. costata* and *H. ryukyuensis* sp. nov. with the sexually dimorphic eyes and abdominal sternite I, and the presence of an additional ridge on the elytra between the suture and humeral costa. It is characterized by the uniform middle tarsomere I in both sexes (in contrast to the apically swollen one in *H. ryukyuensis* sp. nov. (Fig. 24) and asymmetrically swollen one in *H. costata* (Fig. 18)), small curved appendage on abdominal sternite I (in contrast to the recurved appendage in *H. costata* (Figs. 17A, B) and the long curved appendage in *H. ryukyuensis* sp. nov. (Figs. 23A, B)), relatively shorter and filiform antennae in males (in contrast to the relatively long antennae in *H. ryukyuensis* sp. nov. and the extremely long antennae in *H. costata*), and wide, strongly recurved spermatheca (in contrast to the wide and slightly recurved one (Fig. 26) in *H. ryukyuensis* sp. nov. and the narrow, strongly recurved one in *H. costata* (Fig. 20)).

**Etymology:** It is named after Hsing Tzung Cheng, who collected part of the type series.

**Host plants:** *Clerodendrum cyrtophyllum* Turcz., 1863 and *C. trichotomum* Thunb., 1780 (Verbenaceae).

**Distribution:** Taiwan (Fig. 27). This is the most common and widespread species of *Haplosomoides* in Taiwan based on numerous literature records, examined specimens, and field experience of the senior author. Most populations inhabit the lowlands.

**Note:** Adults are diurnal. They usually fly around host plants and feed on leaves during the daytime.

**Haplosomoides costata** (Baly, 1878)  
(Figs. 15-20)

*Mimastra costata* Baly, 1878: 415 (type locality: “China”).  
*Haplosomoides costatus* Kimoto, 1989b: 76 (list); Mohamedsaid, 1994: 104 (Borneo).  

**Type material:** The lectotype ♂ of *Mimastra costata* Baly, here designated to preserve nomenclatural stability is labeled: “Type (white round label with red collar)/ *Mimastra costata* Baly China (Baly’s handwritten label, grey)/ Baly coll. (white label)/ SYNTYPE *Mimastra costata* Baly (white printed label)”. It is in good condition and is deposited in the BMNH. One male and 1 female paralectotypes are labeled: “Baly coll. (white label)/ SYNTYPE *Mimastra costata* Baly (white printed label added by curators before the loan)” (BMNH). A female paralectotype is labeled: “Foo Chow (white handwritten label)/ Baly coll. (white label)/ SYNTYPE *Mimastra costata* Baly (white printed label)” (BMNH).

**Male:** Length 6.4-6.5 mm, width 2.4 mm. Color yellowish-brown; antennae blackish-brown, 2 or 3 basal antennomeres paler; elytra black, with yellowish-brown basolateral angles. Eyes prominent, distance between eyes much narrower than diameter of eye. Antennae (Fig. 15) filiform and very long, as long as body size, antennomeres V-XI widened. Pronotum quadrilateral, slightly widened anteriorly, surface moderately depressed behind middle; WP/LP = 1.71-1.77. Elytra wider than diameter of eye. Antennae (Fig. 15) filiform and very long, as long as body size, antennomeres V-XI widened. Pronotum quadrilateral, slightly widened anteriorly, surface moderately depressed behind middle; WP/LP = 1.71-1.77. Elytra elongate (EL/WL = 2.03-2.04), moderately widened near apex; with a sharp ridge rising from humerus, abbreviated near apex, and an additional ridge also rising from humerus running between suture and sharp ridge. All tibiae straight. Front tarsomere I normal. Middle tarsomere I (Fig. 18) asymmetrically widened, ventrally flattened. Abdominal sternite I with a longitudinal appendage extending from middle of posterior margin (Fig. 17A, B), wide in lateral view, laterally flattened, and bent upwards, ventral surface with dense short setae from apical 1/3 to apex. Abdominal sternite...
V with straight apical margin. Genitalia (Figs. 19A, B) long and slightly curved, apically pointed, apex narrow in lateral view.

**Female**: Length 7.1-7.5 mm, width 2.8-3.1 mm. Similar to male but eyes relatively smaller, distance between eyes wider than diameter of eye. Antennae filiform, shorter than male’s in length (Fig. 16), about 0.7x length of body. Pronotum quadrilateral, slightly widened anteriorly, surface moderately depressed behind middle; WP/LP = 1.60-1.66. Elytra wider than male’s (LE/WE = 1.83-1.88). Abdominal sternite I without appendages. Spermathecal cornu wide and strongly recurved (Fig. 20); nodulus long, a little narrower than cornu; proximal spermathecal duct wide and long.

**Other specimens examined**: 1 ♂: China: Guizhou, Huaxi, May-July 1979, Chinese Academy of Science (TARI); 1 ♀, China: Hubei, Yichang, 11 June 1980, Chinese Academy of Science (TARI);


1.0 mm

0.5 mm

0.3 mm

0.1 mm

**Diagnosis:** See diagnosis of *H. chengi* sp. nov.

**Distribution:** China, Vietnam, East Malaysia.

**Haplosomoides ryukyuensis** sp. nov.  
(Figs. 21-26)

*Mimastra costata* Miwa, 1933: 12 (Iriomote, Japan).

**Haplosomoides costatus** Chûjô, 1935a: 84 (Ishigaki, Iriomote, Okinawa, Japan); Chûjô, 1935b: 206 (Ishigaki, Japan); Chûjô, 1961: 87 (Amami-Ôshima, Japan); Nakane and Kimoto, 1961: 19 (Okinawa, Japan); Chûjô and Kimoto, 1961: 164 (list; host plant; Ishigaki, Japan); Kimoto and Gressitt, 1966: 525 (Yonakuni, Japan); Kimoto, 1985 (list).

**Type material** (45 specimens): Holotype δ: Japan, Ishigaki, May 1933, leg. S. Hirayama (TARI); paratypes: 15 δ, 19 ♀♀, same data as for holotype (TARI, NMNH, JBCB); 1 δ, 2 ♀♀, Ishigaki, 22 Apr. 1930, leg. R. Takahashi (TARI); 1 δ, Ishigaki, Kabira, 20 Mar. 1980, leg. A. Ishida (EUMJ); 2 ♀♀, Okinawa, Nago, 10 May 1931, leg. S. Asahina (TARI); 1 ♀, Okinawa, Naha, 24 July 1932, leg. T. Shiraki (TARI); 1 ♀, Okinawa, Hiji, Kunigami, 15-20 June 1994, leg. K. Okada (EUMJ); 1 ♀, Okinawa, Yona, Kunigami, 18 June 1994, leg. K. Okada (EUMJ); 1 δ (without head), Iriomote, 20 July 1932, leg. Shiraki (TARI); 1 δ, 2 ♀♀, Iriomote, 21 May 1932, leg. S. Hirayama (TARI).

**Male:** Length 6.8-7.7 mm, width 2.6-2.9 mm. Color yellowish-brown; antennae blackish-brown, 2 or 3 basal antennomeres paler; elytra black. Eyes prominent, distance between eyes much narrower than diameter of eye. Antennae (Fig. 21) filiform and very long, as long as body. Pronotum quadrilateral, slightly widened anteriorly, surface moderately depressed behind middle; WP/LP = 1.51-1.56. Elytra wider than male's (LE/WE = 1.83-1.90). All tibiae straight. Front and middle tarsomere I normal. Abdominal sternite I without appendages. Spermathecal cornu wide and slightly recurved (Fig. 26); nodulus long, as wide as cornu; proximal spermathecal duct relatively wider and long.

**Diagnosis:** See diagnosis of *Haplosomoides* chengi sp. nov.

**Etymology:** It is named for the Ryuku I. chain, Japan.

**Host plant:** *Clerodendrum trichotomum* Thunb., 1780 (Verbenaceae) (Chûjô and Kimoto 1961).

**Distribution:** Japan: Okinawa, Ishigaki, and Iriomote, also found on Yonakuni (Kimoto and Gressitt 1966) and Amami-Ôshima (Chûjô 1961).

**Haplosomoides annamita group**

**Diagnosis:** Elytral carinae not very sharp, often quite weak. Eyes variable, uniform in some species but sexually dimorphic in others. Abdominal sternite I without longitudinal appendages in males.

**Haplosomoides changi** sp. nov.  
(Figs. 5-8, 29-33)

**Haplosomoides egena** Kimoto, 1984: 49 (misidentification; Kenting, in Kaohsiung, Taiwan)

**Type material** (21 specimens): Holotype δ: Taiwan: Taoyuan, Lalashan, 8 Mar. 2009, leg. S.-F. Yu (TARI); paratypes: 3 δ, 1 ♀, same data as for holotype; 9 δ, same but with leg. M.-H. Tsou; 1 δ, 1 ♀, same but with leg. H. Lee; 2 δ, 1 ♀, same locality, 2 Apr. 2009, leg. H. Lee; 1 δ, same locality, 9 May 2008, leg. Y.-L. Lin; 1 ♀: Taiwan: Ilan, Taipingshan, 12 June 2007, leg. Y.-C. Chang (TARI, EUMJ, JBCB, NMNH).

**Male:** Length 4.8-5.6 mm, width 1.7-2.0 mm. Color (Figs. 5, 6) yellowish-brown; metasternum, metepisternum, and abdomen black; scutellum dark brown; antennae black, 3 basal antennomeres yellowish-brown; mesotibia brown.
or dark brown; metatibia blackish-brown. Eyes very small, distance between eyes much greater than diameter of eye. Antennae long (Fig. 29), about 0.8x as long as body, antennomeres III-V apically swollen. Pronotum widened anteriorly; surface strongly depressed behind middle; WP/LP = 1.32-1.39. Elytra elongate (LE/WE = 2.18-2.23); sides parallel; without distinct costa. All tibiae straight. Front and middle tarsomere I (Figs. 31A, B) longer than II, apically swollen; bilobed tarsomere III asymmetrical, 1 lobe smaller than other. Abdominal sternite V with straight apical margin. Genitalia (Figs. 33A, B) wide and moderately curved; apex widely rounded, middle of apical margin with a short, sharp process; dorsal surface with hollow opening, apically widened, abruptly widened near base, basal margin truncate; ventral surface with 1 pair of longitudinal ridges, apically conjoined, abbreviated near middle.

**Female:** Length 5.6-6.0 mm, width 1.9-2.2.

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Color similar to male’s. Eyes very small, distance between eyes much greater than diameter of eye. Antennae short (Fig. 30), about 0.7x length of body, antennomeres III-V apically swollen. Pronotum similar to male’s (WP/LP = 1.35-1.46). Elytra similar to male’s (LE/WE = 2.21-2.28). All tibiae straight; front and middle tarsomeres I normal. Abdominal sternite V with narrowly rounded apical margin. Spermathecal cornu wide and moderately recurved (Fig. 32); nodulus long, as wide as cornu; proximal spermathecal duct long and relatively wider.

*Other specimens examined:* 1 ♀: “(FOR-MOSA) Kenting Park Pingtung Hsien May, 4, 1982, N. Ohbayashi leg.” (KMNH).

*Diagnosis:* This new species is similar to *H. annamita* (Allard) with the dark brown or blackish-brown ventral surface and the absence of distinct costa on the elytra. *Haplosomoides annamita* can be distinguished from *H. changi* sp. nov. by the combination of the following characters: eyes sexually dimorphic, eyes of male much larger than female’s; front and middle tarsomeres I subequal to II in length (Figs. 36, 37), swollen and ventrally flattened, bilobed tarsomere III symmetrical; front tarsi similar to middle, but tarsomere I slightly swollen. Male genitalia (Figs. 39A, B) extremely slender and slightly curved. Spermatheca (Fig. 38) with relatively narrower spermathecal cornu, and proximal spermathecal duct apically narrowed.

*Etymology:* It is named after Yu-Chi Chang, who collected part of the type series.

Figs. 27-28. Distribution map of *Haplosomoides* species, solid line: 1000 m, broken line: 2000 m in elevation. 27. *Haplosomoides changi* sp. nov. 28. Blue circle, *H. abdominalis* Kimoto; green circle, *H. abdominalis* Kimoto and *H. tsoui* sp. nov.; red circle, *H. tsoui* sp. nov.
**Host plant:** Clerodendrum trichotomum Thunb., 1780 (Verbenaceae).

**Distribution:** Taiwan.

**Note:** Adults are diurnal. They fly around host plants and feed on leaves during the daytime.

**Haplosomoides annamita (Allard, 1888)**
(Figs. 34-39)


Haplosomoides annamitus Kimoto, 1989b: 75 (Thailand, Laos, Vietnam); Mohamedsaid, 2007: 613 (Cambodia).


**Male:** Length 5.3-5.8 mm, width 1.8-1.9 mm. Color yellowish-brown; metathorax and abdomen black. Eyes prominent, distance between eyes...
smaller than diameter of eye. Antennae long (Fig. 34), about 0.9x as long as body, antennomeres III-V apically swollen. Pronotum widened anteriorly; surface strongly depressed behind middle; WP/LP = 1.38-1.48. Elytra elongate (LE/WE = 2.11-2.13); sides parallel; without distinct costa. All tibiae straight. Front and middle tarsomeres I as long as II (Figs. 36, 37), swollen and ventrally flattened; middle tarsomere I (Figs. 37A, B) more strongly swollen than front tarsomere I (Figs. 36A, B); bilobed tarsomere III symmetrical. Abdominal sternite V with straight apical margin. Genitalia (Figs. 39A, B) extremely slender and slightly curved; apex pointed.

**Female:** Length 6.3 mm, width 2.4 mm. Color similar to male's. Eyes very small, distance between eyes much greater than diameter of eye. Antennae short (Fig. 35), about 0.6x length of body, antennomeres III-V apically swollen. Pronotum similar to male's (WP/LP = 1.55). Elytra

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similar to male's (LE/WE = 2.00). All tibiae straight. Front and middle tarsomeres I normal. Abdominal sternite V with narrowly rounded apical margin. Spermathecal cornu wide and strongly recurved (Fig. 38); nodulus long, as wide as cornu; proximal spermathecal duct long and narrow.

Other specimens examined: 2 ♂♂; Annam (in Vietnam) Mus. Pragense (JBCB); 1 ♀; N. Vietnam, 21°35’N 106°30’E 52 km SW of Lang Son 27 Apr. - 6 May 1996, 370 m leg. Pacholátko and Demicky (JBCB).

Distribution: China, Vietnam, Laos, Thailand, Cambodia.

Haplosomoides miyamotoi group

Diagnosis: Elytral carinae quite sharp, distinct; without additional sharp ridges rising from humerus. Abdominal sternite I without longitudinal appendages in males. Tibiae more or less curved in males. Eyes uniform in both sexes.

Haplosomoides abdominalis Kimoto, 1984
(Figs. 28, 40-51, 56-62)

Haplosomoides miyamotoi Kimoto, 1969: 34 (misidentification; Sungen-Peilung, in Miaoli, Taiwan)
Haplosomoides abdominalis Kimoto, 1984: 48; Kimoto, 1989a: 251 (Shi Nan Shan, Ya Kou, and Mei Shan-Tien Chi, in Kaohsiung, Taiwan); Kimoto, 1991: 11 (Yu Shih, in Nantou; Tien Chi, and Shi Nan Shan, in Kaohsiung; Pi Shan Spa, in Taitung, Taiwan); Takizawa et al., 1995: 10 (Tienhsiang, in Hualien; Wuhe, in Nantou, Taiwan).


Male: Length 5.7-6.4 mm, width 2.1-2.5 mm. Color, pronotum, and elytra variable between populations (Figs. 40, 41, 44, 45, 48, 49; see remarks). Eyes very small, distance between eyes much greater than diameter of eye. Antennae long (Fig. 56), about 0.9x as long as body, antennomeres III-VIII apically swollen. Protibia (Fig. 58A) weakly curved at apical 1/3; mesotibia (Fig. 58B) similar to protibia in length, but strongly curved; metatibia (Fig. 58C) longest, about 1.3x length of mesotibia, very weakly curved. Front and middle tarsomeres I normal; hind tarsomere I about 1.3x length of tarsomere II. Abdominal sternite V with bilobed apical margin (Fig. 59), strongly convex between lobes, with a transverse sclerite projecting ventrally. Genitalia (Figs. 61A, B) wide and slightly curved, apically pointed, apex slender in lateral view.

Female: Length 5.6-7.0 mm, width 2.1-2.9 mm. Color, pronotum, and elytra variable between populations (Figs. 42, 43, 46, 47, 50, 51; see remarks). Eyes very small, distance between eyes much greater than diameter of eye. Antennae (Fig. 57) short, about 0.7x length of body size, antennomeres III-VI apically swollen. Mesotibia weakly curved; other tibiae straight. Front and middle tarsomeres I normal. Abdominal sternite V with moderately emarginated apical margin (Fig. 60A); with a process at concavity in some individuals (Fig. 60B). Spermathecal cornu extremely wide and strongly curved (Fig. 62); nodulus short, much wider than cornu; proximal spermathecal duct wide and long, recurved near base.

Remarks: Populations from different parts of Taiwan show differences in color and pronotal and elytral shape. In eastern populations (Taipingshan, Hohuashan, Kuanyuan, and Pilu) (Figs. 40-43), males have a yellowish-brown body, while females are dark brown except for the yellowish-brown pronotum and elytra. The pronota in males are a little wider than those of females (WP/LP = 1.45-1.59 in males; 1.37-1.48 in females), but the elytra in males are as wide as those in females (LE/WE = 1.65-1.77 in males; 1.71-1.76 in females). In southern populations (Wutai, Tengchih, and Taoyuan) (Figs. 44-47), both sexes have a dark brown body, but the head, pronotum, and elytra are yellowish-brown. The pronota of both sexes are similar (WP/LP = 1.43-1.44 in males; 1.39-42 in females); moreover, the elytra are similar but much narrower than those of eastern populations (LE/WE = 1.99-2.10 in males; 1.92-2.13 in females). In northern and western populations (Taipingshan,
Maimei, Talulintao, Kuanwu, Kukuan, Tungpu, Meifeng, and Tsuifeng) (Figs. 48-51), males are brown, but sometimes the antennae are darkened, while females are dark brown except for the brown head, pronotum, and elytra. The pronota of males are wider than those of females (WP/LP = 1.42-1.51 in males, 1.35-1.39 in females); but the elytra of males are longer than those of females (LE/WE = 1.92-1.95 in males; 1.71-1.84 in females). Although these populations show external morphological differences, they do not show variations in aedeagal morphology and are treated as conspecific.

**Diagnosis:** *Haplosomoides abdominalis* is similar to *H. miyamotoi* and *H. tsoui* sp. nov. in the dorsally flattened elytra and the presence of a sharp ridge from the humerus. Although its pronotum and elytra are too variable for species diagnosis, this species is characterized by the strongly curved mesotibia in males.

Figs. 40-47. Habitus of *Haplosomoides abdominalis* Kimoto. 40. Male, dorsal view; collected from Hohuanshan, Nantou. 41. Same, ventral view. 42. Female, dorsal view; collected from Hohuanshan, Nantou. 43. Same, ventral view. 44. Male, dorsal view; collected from Wutai, Pingtung. 45. Same, ventral view. 46. Female, dorsal view; collected from Wutai, Pingtung. 47. Same, ventral view.
Other specimens examined (229 specimens):

Figs. 48-55. Habitus of species of Haplosomoides. 48. Haplosomoides abdominalis Kimoto, male, view; collected from Taipingshan, Ilan. 49. Same, ventral view. 50. Same population, female, dorsal view. 51. Same, ventral view. 52. Haplosomoides tsoui sp. nov., male, dorsal view. 53. Same, ventral view. 54. Haplosomoides tsoui sp. nov., female, dorsal view. 55. Same, ventral view.

Figs. 56-62. *Haplosomoides abdominalis* Kimoto. 56. Antenna, male. 57. Antenna, female. 58. Tibiae, male. (A) Protibia; (B) Mesotibia; (C) Metatibia. 59. Apex of abdominal sternite V, male. 60. Apex of abdominal sternite V, female. (A) Normal type; (B) Variation. 61. Genitalia. (A) Dorsal view; (B) Lateral view. 62. Spermatheca.

*Host plant*: *Deutzia pulchra* Vidal, 1886 (Saxifragaceae).

*Distribution*: Taiwan. It is a widespread species and inhabits mountainous areas (Fig. 28). Adults are closely associated with the host plant.

*Note*: Adults are nocturnal. They are usually inactive and rest on the undersides of leaves of host plants during the daytime.

**Haplosomoides miyamotoi** Kimoto, 1965

(Figs. 63-66)


*Male*: Length 5.6 mm, width 2.1 mm. Color yellowish-brown. Eyes very small, distance between eyes much greater than diameter of eye. Antennae (Fig. 63) very short, about 0.7x length of body. Pronotum transverse; lateral margins slightly rounded; slightly depressed behind middle; WP/LP = 1.67. Elytra elongate (LE/WE = 2.01), sides subparallel, slightly widened posteriorly, widest at apical 1/3, surface with a sharp ridge rising from humerus, abbreviated near apex, dorsally flattened, slightly convex between ridges. Protibia (Fig. 64A) straight; mesotibia (Fig. 64B) subequal to protibia in length, slightly curved near apex; metatibia (Fig. 64C) longest, about 1.3x length of mesotibia, straight. Front and middle tarsomeres I normal; hind tarsomere I long, about 1.6x length of tarsomere II. Abdominal sternite V with bilobed apical margin (Fig. 65), flat between lobes, with a transverse sclerite projecting ventrally, a longitudinal internal suture in middle. Genitalia (Figs. 66A, B) relatively narrow and moderately curved, apically narrow; apex narrowly rounded, wide in lateral view.

*Other specimens examined*: 1 ♂, Amami-Oshima, Kagosima, Japan, 26 Apr.-5 May 1967, leg. H. Takizawa (TARI).

*Diagnosis*: *Haplosomoides miyamotoi* is very similar to *H. tsoui* sp. nov. with its weakly curved mesotibia in males, but differs by its short antennae, relative longer hind tarsomere I, moderately curved male genitalla, and straight metatibia in males.

Figs. 63-66. *Haplosomoides miyamotoi* Kimoto, male. 63. Antenna. 64. Tibiae. (A) Protibia; (B) Mesotibia; (C) Metatibia. 65. Apex of abdominal sternite V. 66. Genitalia. (A) Dorsal view; (B) Lateral view.
Distribution: Japan (Amami-Oshima).

Haplosomoides tsoui sp. nov.
(Figs. 28, 52-55, 67-73)

Haplosomoides abdominalis Kimoto, 1984: 48 (part; Fenchihu, in Chiayi, Taiwan)


Male: Length 5.7-6.2 mm, width 1.9 mm. Color (Figs. 52, 53) yellowish-brown, pronotum sometimes with 1 narrow, longitudinal, dark band; ventral surface dark brown. Eyes very small, distance between eyes much greater than diameter of eye. Antennae (Fig. 67) long, about 0.9x length of body, antennomeres III-VI apically swollen. Pronotum quadrilateral, slightly depressed behind middle; WP/LP = 1.39-1.42. Elytra elongate (LE/WE = 2.18-2.27), sides subparallel, slightly widened posteriorly, widest at apical 1/3, surface with a sharp ridge rising from humerus abbreviated near apex, dorsally flattened, slightly convex between ridges. Protibia (Fig. 69A) straight; mesotibia (Fig. 69B) weakly curved at apical 1/3; metatibia (Fig. 69C) longest, about 1.3x length of mesotibia, very weakly curved. Front and middle tarsomeres I normal; hind tarsomere I about 1.4x length of tarsomere II. Abdominal sternite V with strongly depressed apical margin near middle (Fig. 70), with a transverse sclerite projecting ventrally. Genitalia (Figs. 73A, B) wide and slightly curved, apically narrowed, apex narrowly rounded, slender in lateral view.

Female: Length 5.7-6.1 mm, width 2.1-2.3. Color (Figs. 54, 55) similar to male’s. Eyes very small, distance between eyes much greater than diameter of eye. Antennae (Fig. 68) short, about 0.7x length of body, antennomeres III-VI apically swollen. Pronotum with slightly widened lateral margins anteriorly (WP/LP = 1.31-1.40). Elytra widened posteriorly, widest at apical 1/3, wider than male’s (LE/WE = 1.95-2.05). Protibia straight; meso- and metatibiae very weakly curved. Front and middle tarsomeres I normal. Abdominal sternite V with prominently emarginated apical margin in middle (Fig. 71). Spermathecal duct wide and long, recurved twice near base.

Remarks: Two males collected from Fenchihu were respectively designated the paratotype and paratype of H. abdominalis Kimoto by Kimoto (1984). Both specimens belong to this new species.

Diagnosis: See diagnosis of H. miyamotoi.

Etymology: It is named after Mei-Hua Tsou, who collected part of the type series.

Host plant: Deutzia pulchra Vidal, 1886 (Saxifragaceae).

Distribution: Taiwan. It is restricted to central and southern Taiwan (Nantou, Kaohsiung, Pingtung, and Taitung Counties) (Fig. 28). Adults are closely associated with the host plant, which is sympatric with H. abdominalis Kimoto.

Key to species of Haplosomoides of Taiwan and Japan

1. Elytral carinae quite sharp, or at least always fairly distinct .

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1a. Elytral carinae not very sharp, often quite weak .

...............................(H. annamita group) 7

2. Elytra black, with an additional sharp ridge rising from humerus; abdominal sternite I with 1 longitudinal appendage in males; eyes sexually dimorphic (Figs. 1, 3) .

...............................(H. costata group) 3

2a. Elytra brown, without additional sharp ridges rising from humerus; abdominal sternite I without longitudinal appendages in males; eyes uniform in both sexes (Figs. 40-51) .

...............................(H. miyamotoi group) 5

3. Abdominal appendage strongly recurved, apex extremely flattened laterally (Figs. 17A, B); mesotarsomere I in males asymmetrically swollen (Fig. 18) .

H. costata (Baly)
Figs. 67-73. *Haplosomoides tsoui* sp. nov. 67. Antenna, male. 68. Antenna, female. 69. Tibiae, male. (A) Protibia; (B) Mesotibia; (C) Metatibia. 70. Apex of abdominal sternite V, male. 71. Apex of abdominal sternite V, female. 72. Spermatheca. 73. Genitalia. (A) Dorsal view; (B) Lateral view.
3a. Abdominal appendage moderately curved, apex swollen (Figs. 11, 23); mesotarsomere I in males normal or apically swollen (Figs. 12, 24).

4. Abdominal appendage relatively shorter (Fig. 11B); mesotarsomere I in males normal (Fig. 12).

4a. Abdominal appendage relatively longer (Fig. 23B); mesotarsomere I in males apically swollen (Fig. 24).

5. Mesotibia in males strongly curved (Fig. 58B).

5a. Mesotibia in males weakly curved (Figs. 64B, 69B).

6. Male antennae relatively shorter, about 0.7x as long as body; metatibia in males straight (Fig. 64C); genitalia moderately curved. (Fig. 66B).

6a. Male antennae relatively longer, about 0.9x as long as body; metatibia in males weakly curved (Fig. 65C); genitalia weakly curved (Fig. 73B).

7. Eyes sexually dimorphic; front and middle tarsomeres I subequal to II in length, medially swollen (Figs. 36, 37); genitalia slender and slightly curved.

7a. Eyes uniform in both sexes (Figs. 5, 7); front and middle tarsomeres I longer than II, apically swollen (Figs. 31A, B); genitalia wide and moderately curved (Figs. 33A, B).

DISCUSSION

The studied species can be classified into 3 species groups. The H. costata group, which comprises H. costata (Baly), H. chengi sp. nov., and H. ryukyuensis sp. nov., is characterized by a black elytra, the presence of an additional ridge on the elytron, and abdominal sternite I with an appendage in males. The H. annamita group, which comprises H. annamita (Allard) and H. changi sp. nov., is characterized by the obtuse ridge on the elytron and black abdomen. The H. miyamotoi group, which comprises H. miyamotoi Kimoto, H. abdominalis Kimoto, and H. tsoui sp. nov., is characterized by a curved middle tibia in males. Although genitalia of most species are simple and not very diagnostic, a number of secondary sexual characters are useful for diagnosis of species such as the shape of the appendage on abdominal sternite I and middle tarsomere I for the H. costata group, the size of the eyes and shapes of the front and middle tarsomeres I for the H. annamita group, and the shape of the tibiae, the length of the antennae, and the apex of abdominal sternite V for the H. miyamotoi group. Haplosomoides costata (Baly) is assumed to be a widespread species found in China, Japan, Taiwan, Vietnam, and eastern Malaysia (Medvedev 2002, Beenen 2010). Based on our results, concerning specimens from Taiwan and Japan, it cannot be excluded that more unrecognized species may turn up when populations from other parts of the supposed range of Haplosomoides are investigated. Furthermore the synonymization of H. ustulata Laboissière by Medvedev (2000) needs confirmation, because this was based on examination of a single female specimen.

Haplosomoides chengi sp. nov. and H. abdominalis Kimoto are widespread in Taiwan (Figs. 27, 28); however, the former is always found in the lowlands and the latter in mountain areas, mainly because of a close association with their host plants. Moreover, different populations of H. abdominalis display morphological variations based on their geographic distributions. It can be separated into 4 populations based on morphological differences. The distributions of 4 populations are similar to those of Agetocera taiwana species groups (Lee et al. 2010). This implies that they may have been affected by the same geographic isolation.

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