

Two New *Chlorophorus* (Coleoptera, Cerambycidae) from Mt. Dahan Shan, Southern Taiwan

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Abstract Two new clytine beetles belonging to the genus *Chlorophorus* CHEVROLAT are described from Mt. Dahan Shan, southern Taiwan. They are very similar in basic features to each other, and distinguished from other Taiwanese members of the genus by the black maculation on the pronotum and elytra, and different features of male genitalia. One of the new species is named *C. takakuwai* to the memory of the late Dr. Masatoshi TAKAKUWA.

Introduction

The genus *Chlorophorus* CHEVROLAT, 1863 is one of the dominant groups of the tribe Clytini and has so far been recorded 256 species from Palearctic, Oriental, Afrotropical, Australian and Neotropical Regions (TAVAKILIAN & CHEVILLOTTE, 2017). The members of the genus are readily distinguished from its related genera such as *Rhaphuma* PASCOE, 1858 by the markedly large male genitalia which is provided with the heavily sclerotised rugosities in the endophallus. In the Taiwanese fauna of Clytini, 17 members of the genus *Chlorophorus* have been recorded so far (NAKAMURA *et al.*, 2014). Recently I found two new species of the genus from Mt. Dahan Shan, Chunri Township of Pingtung County, which is one of the famous collecting sites located in the southernmost part of the Central Mountains of Taiwan.

The present paper is dedicated to the late Dr. Masatoshi TAKAKUWA (1947–2016) who unexpectedly passed away on 25 August 2016. Dr. TAKAKUWA once visited Mt. Dahan Shan with the first author in early May of 2013. A new species of the genus *Chlorophorus* from this mountain is named and described to the memory of Dr. TAKAKUWA.

Materials and Methods

Materials used in the present study were from the private collections of collectors as shown in the type series of new taxa. The holotype and allotype of each new taxon are preserved in the National Museum of Natural Science, Taichung, Taiwan (NMNST), and the paratypes are in the private collections of C.-M. CHEN (CC), J.-F. CHEN (JC), W.-I. CHOU (WC), Y.-L. LIN (YL), S. NAKAZATO (SN), T. NIISATO (TN) and T. WAKEJIMA (TW)

Materials were observed under a stereoscopic microscope (OLYMPUS SZX16), an optical microscope (OLYMPUS BX53M) with a microscope digital camera (OLYMPUS DP73) and an image analysis software (OLYMPUS Cell Scens). SEM images were taken by a Keyence VHK-D500 Ultra Depth Multi-Angle Observation System. The whole habitus of specimens and male genitalia were photographed by a Canon digital camera EOS 70D with macro photo lens EF-50mm or MP-E65mm and Life-size Converter EF.

The abbreviations used for the ratio of the measurement in the description are as follows: HW — maximum width of head across tempora just behind lower eye-lobes; PL — length of pronotum; PW — maximum width of pronotum near middle; PA — apical width of pronotum; PB — basal width of pronotum; EL — length of elytra; EW — humeral width of elytra; M — arithmetic mean. The measurements in the description are used basically based on all the specimens of type series, though ten pairs in *Chlorophorus takakuwai* sp.nov.

Taxonomy

Chlorophorus dahanshanus sp. nov.

(Figs. 1, 2, 9, 10, 13–19)

Colour black, dark yellowish brown in mouthparts except for black mandibles, dark brown in tarsal claws, apical part of terminal segment in ♂ or apical two segments in ♀ of antennae.

Body densely clothed with yellowish gray pubescence, the pubescence becomes whitish in colour in scutellum, sides of metathorax and abdominal ventrites 1–4 except for their median parts, dull reddish yellow on pronotum and basal fourth of elytra, and more or less greenish in median part of metasternum in ♂, most parts of prosternum and mesosternum. Pronotum arranged with maculations of black pubescence as follows: 1) a large spot at centre just behind middle, slightly produced at middle of anterior margin and narrowly emarginate at middle of posterior margin; 2) a pair of small, oblong and slightly oblique spots at sides just before the median spot. Elytron arranged with maculations of black pubescence as follows: 1) a C-shaped band in basal fourth, widened and attaining humerus at anterior end, whose posterior end connecting near middle of the median band; 2) a broad arcuate band at a level between basal fourth and just behind middle, narrowly produced anteriorly along sutural margin and closely approximate to the basal band; 3) a broad oblique band in apical fourth, slightly wider than gray pubescent areas before and behind of the band.

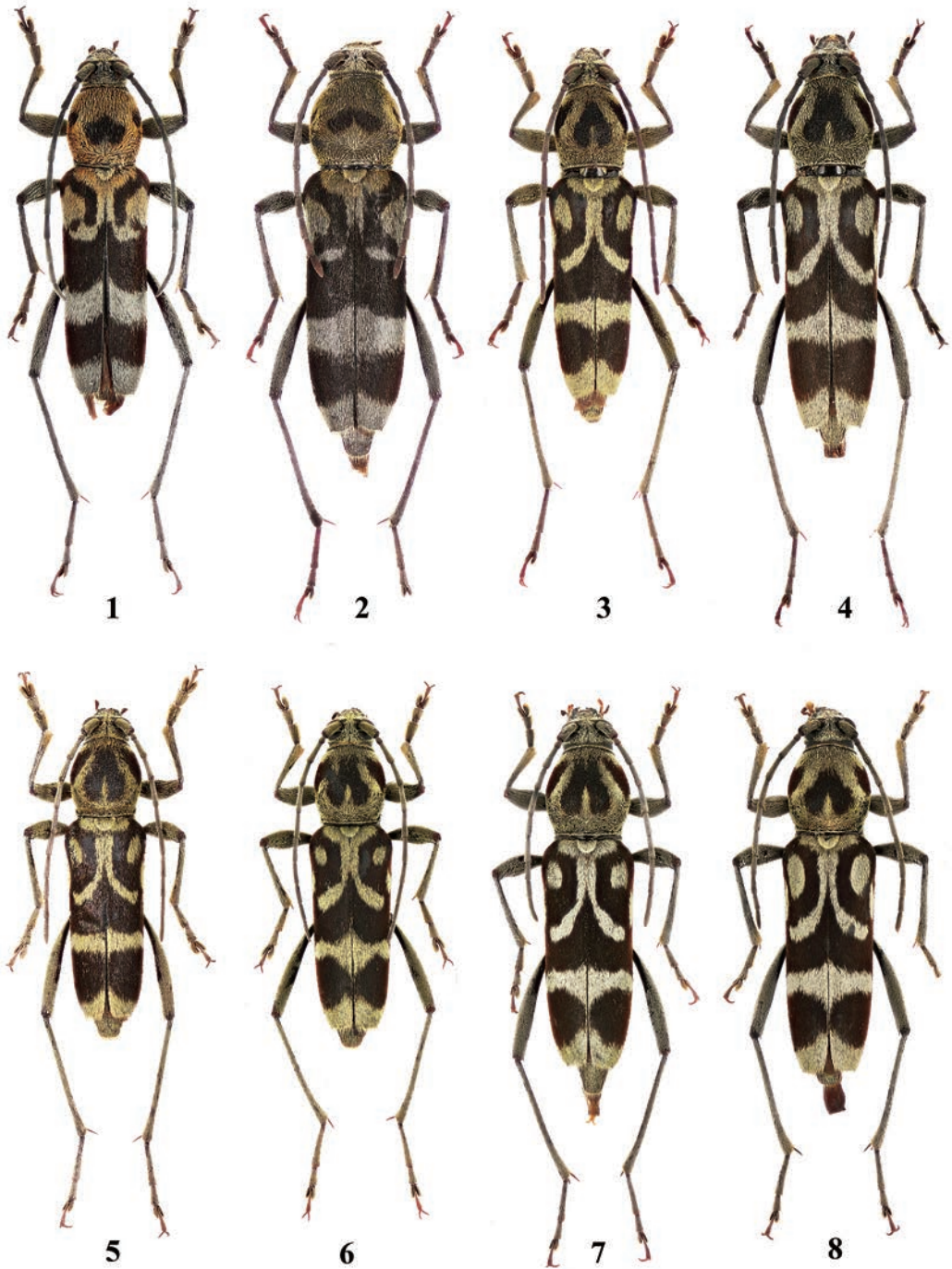
M a l e. Body length (n = 11) 12.30–13.80 mm (from apical margin of clypeus to elytral apices).

Head slightly wider in the apical width or distinctly narrower than in the maximum width of pronotum, coarsely punctured, HW/PA 1.05–1.16 (M 1.10), HW/PW 0.66–0.74 (M 0.69); frons 1.25 times as long as the basal width, rather distinctly emarginate at sides, weakly raised in median triangular part of apical half, with a median smooth line in basal half; genae 4/5 the depth of lower eye-lobes in frontal view; eyes moderately prominent, with upper-lobes separated each other by 1/3 the width of head. Antennae medium in length, attaining apical 2/5 of elytra, relatively stout; scape gently arcuate, a little longer than segment 3 or the same length to segment 5; segments 3–9 somewhat distinctly dilated towards each apex; terminal segment acute and more or less flattened in apical part.

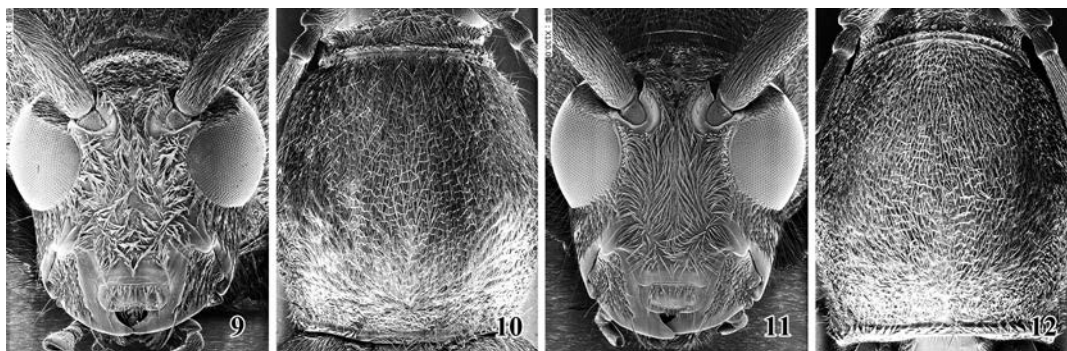
Pronotum slightly longer than wide, moderately arcuate at side, widest at basal 2/5, PL/PW 0.94–1.15 (M 1.05), PL/PA 1.63–1.75 (M 1.67), PA/PB 0.73–0.83 (M 0.76); disc strongly raised towards the highest point of basal third, then suddenly declivous to basal margin, reticulately punctured throughout. Scutellum rounded triangular.

Elytra medium in length, EL/EW 2.32–2.56 (M 2.48), slightly wider than pronotum; sides slightly sinuate, with humeri hardly prominent; apices oblique, each with arcuate margin, and blunt external tooth; disc strongly raised near suture behind scutellum, finely punctured throughout.

Ventral surface densely finely punctured; mesosternal process broad, slightly emarginate at apical margin; anal ventrite trapezoidal, almost truncate at apical margin.



Figs. 1–8. *Chlorophorus* spp. from southern Taiwan. — 1, *C. dahanshanus* sp. nov., holotype, ♂; 2, ditto, paratype (allotype), ♀; 3, *C. takakuwai* sp. nov., holotype, ♂; 4, ditto, paratype (allotype), ♀; 5–8, ditto, paratypes, showing the variations of black maculation on pronotum and elytra (5–7, ♂; 8, ♀).



Figs. 9–12. Head and pronotum of *Chlorophorus* spp. from southern Taiwan (SEM images). — 9, 10, *C. dahanshanus* sp. nov., holotype, ♂; 11, 12, *C. takakuwai* sp. nov., holotype, ♂. — 9, 11, Head in frontal view; 10, 12, pronotum in dorsal view, showing the reticulation on disc.

Legs medium in length, not so stout; hind femora barely reaching elytral apices; first hind tarsal segment a little longer than the following two segments combined.

Male genitalia shown like a typical feature of most members of the genus such as the type species, *C. annularis* (FABRICIUS, 1787). Median lobe relatively slender and elongate, weakly arcuate in profile; ventral plate with sides gently emarginate near apical third, then narrowed in arcuate line to the abruptly pointed extremity; dorsal plate with sides weakly dilated from apical 2/5 to truncate apex; median struts short, about 1/3 the length of median lobe. Tegmen a little longer than median lobe, weakly arcuate in profile; paramere half the length of tegmen, dehiscent in apical 2/5 and approximate each other, with each lobe distinctly arcuate in external side though gently so in inner side, provided with very short setae near apex. Eighth tergite rounded at apical margin. Eighth sternite truncate at apical margin.

F e m a l e. Body length ($n = 5$) 12.50–15.00 mm (from apical margin of clypeus to elytral apices).

Body broad; antennae attaining the middle of elytra, with segments 7–10 strongly reduced in length; pronotum more distinctly arcuate at side than in male, with dull reddish yellow pubescence sparser than in that of male; anal ventrite subtriangular in shape, rounded at apex; legs shorter than in male, with hind femora not reaching elytral apices. Standard ratios of body parts are as follows: HW/PA 1.05–1.10 (M 1.07), HW/PW 0.65–0.67 (M 0.65), PL/PW 0.97–1.03 (M 0.98), PL/PA 1.55–1.67 (M 1.62), PA/PB 0.69–0.77 (M 0.72), EL/EW 2.46–2.53 (M 2.46).

Type series. Holotype: ♂ (NMNST), Mt. Dahan Shan, Chunri Township, Pingtung County, Taiwan, 3.VIII.2007, W.-S. LIN leg. Paratypes (10 ♂♂, 5 ♀♀): 1 ♀ (allotype; NMNST), same locality as the holotype, 5.VIII.2006, S.-Z. LU leg.; 1 ♂ (YL), same as the preceding, 28.VII.2006; 5 ♂♂ (WC & TN), same locality as the preceding but 1,400 m in altitude, 1–2.VIII.2009, W.-I CHOU leg.; 1 ♂ (WC), same as the preceding, 5.VII.2010; 1 ♀ (CC), same locality as the preceding, 18.VII.2010, C.-M. CHEN leg.; 1 ♂ (WC), same locality as the preceding with 1,400 m in altitude, 31.VII.2010, W.-I. CHOU leg.; 1 ♀ (WC), same as the preceding but 1,550 m in altitude, 5.VIII.2010; 1 ♀ (TN), same as the preceding but 1,350 m in altitude, 8.VIII.2010; 1 ♀ (TN), same as the preceding but 1,300 m in altitude, 13.VIII.2011; 1 ♂ (JC), same locality as the preceding without altitude, 17.VI.2013, J.-F. CHEN leg.; 1 ♂ (CC), same locality as the preceding, 28.VI.2013, C.-M. CHEN leg.

Distribution. Southern Taiwan (Pingtung County).

Etymology. The new name, *dahanshanus* is derived from the type locality. The new species has so far only been known from Mt. Dahan Shan, southern Taiwan.

Comparative note. *Chlorophorus dahanshanus* sp. nov. is similar in the black maculation on the



Figs. 13–26. Male genitalia of *Chlorophorus* spp. from southern Taiwan. — 13–19, *C. dahanshanus* sp. nov., paratype, ♂; 20–26, *C. takakuwai* sp. nov., paratype, ♂. — 13, 20, Median lobe with non-everted endophallus, lateral view; 14, 21, apical part of median lobe, lateral view; 15, 22, ditto, dorsal view; 16, 23, median lobe, dorsal view; 17, 24, tegmen, lateral view; 18, 25, ditto, dorsal view; 19, 26, 8th abdominal segment, ventral view. Scale: 1.0 mm (a for Figs. 13, 20; b for 16–19, 23–26; c for Figs. 14, 15, 21, 22).

pronotum and elytra to *C. verus* HOLZSCHUH, 1998 described from “Henchun” of Pingtung County, southern Taiwan (HOLZSCHUH, 1998), however, easily distinguished from the latter by the colouration of basic pubescence on the pronotum and elytra; dull reddish yellow on the pronotum and basal fourth of elytra except for the rest part which has yellowish gray pubescence, whereas entirely yellowish green on the pronotum and elytra in *C. verus*.

***Chlorophorus takakuwai* sp. nov.**

(Figs. 3–8, 11, 12, 20–26)

Colour black, dark yellowish brown in mouthparts except for black mandibles, usually dark brown in tarsi though always so in claws.

Body densely clothed with greenish gray pubescence, the pubescence becomes whitish in colour ventral surface, especially at sides of mesosternum, on metepisternum and along apical margins of abdominal ventrites 1–4. Pronotum arranged by maculations of black pubescence as follows: 1) an elongate pyriform spot in large area along midline, which is narrowly emarginate in basal 2/5 or so, 2) a pair of large circular spots at sides of anterior part of the median spot. Elytron arranged by maculations of black pubescence as follows: 1) an O-shaped band in basal third, with sutural margin completely straight, anterior and posterior margins distinctly oblique, ante-external corner extended to humerus, anterior half of external margin extended to lateral margin, blank of O-shaped band varied as circular to longitudinal semicircular due to the development of black area, 2) an arcuate, relatively broad band before middle, with anterior margin narrowly extended to basal fourth along suture, and connected with the post-external corner of O-shaped band near lateral margin, 3) a transvers broad band in apical fourth, with anterior and posterior margins usually arcuate.

Male. Body length (n = 51) 9.40–13.50 mm (from apical margin of clypeus to elytral apices).

Head similar in shape to that of *C. dahanshana* sp. nov., HW/PA 1.06–1.12 (M 1.07), HW/PW 0.68–0.73 (M 0.70); frons almost as long as the basal width, rather weakly emarginate at sides, entirely flattened, with a median smooth line extending from apical margin to vertex; genae 2/3 the depth of lower eyes-lobes in frontal view; eyes moderately prominent, with upper-lobes separated each other by a little less than 1/3 the width of head. Antennae relatively long and thin, attaining apical third of elytra; ratio and shape of each segment similar to those of *C. dahanshana* sp. nov. though middle segments hardly dilated towards each apex.

Pronotum similar in shape to that of *C. dahanshana* sp. nov., though widest at middle or just behind middle, more strongly convex in general, finely reticulately punctured in most part; PL/PW 1.03–1.18 (M 1.11), PL/PA 1.65–1.83 (M 1.70), PA/PB 0.72–0.85 (M 0.79). Scutellum as in *C. dahanshana* sp. nov.

Elytra medium in length, EL/EW 2.43–2.62 (M 2.53), slightly wider than pronotum; sided hardly sinuate, with humeri rounded quadrate; apex oblique in very weak arcuate line, and angulate or very feebly toothed at external angle; disc moderately raised near suture behind scutellum, finely punctured throughout.

Ventral surface densely provided with fine shallow punctures; mesosternal process medium in width, slightly narrowed to apex which is shallowly emarginate; metasternum shallowly concave along midline, which is clothed with dull green pubescence; anal ventrite trapezoidal, slightly arcuate at apical margin.

Legs medium to relatively long; hind femora slightly exceeding elytral apices; first hind tarsal segment 1.4 times as long as the following two segments combined.

Male genitalia similar in many respects to that of *C. dahanshanus* sp. nov., though distinguished

by the following features. Median lobe distinctly slender and elongate; ventral plate with sides weakly dilated from middle to apical sixth, then strongly narrowed in almost straight line to the pointed extremity; dorsal plate with sides strongly dilated from middle to apex; median struts short, about 2/5 the length of median lobe. Tegmen nearly equal in length to median lobe, distinctly arcuate in profile; paramere dehiscent in apical third, with each lobe slightly projected latero-forwardly, almost straight in both external and internal sides, provided with short and medium-length setae near apex. Eighth tergite truncate at apical margin. Eighth sternite slightly emarginate at apical margin.

F e m a l e. Body length (n = 42) 11.40–16.50 mm (from apical margin of clypeus to elytral apices).

Body slightly broader than male, usually clothed with pale gray pubescence; antennae attaining the middle of elytra, with apical four segments strongly reduced in length; metasternum almost flattened along midline, pubescent as on other part; anal ventrite subtriangular in shape, rounded at apical margin; legs shorter than in male, with hind femora almost reaching elytra apices. Standard ratios of body parts are as follows: HW/PA 1.04–1.17 (M 1.07), HW/PW 0.67–0.73 (M 0.70), PL/PW 1.00–1.12 (M 1.06), PL/PA 1.50–1.78 (M 1.63), PA/PB 0.69–0.84 (M 0.78), EL/EW 2.29–2.69 (M 2.46).

Type series. Holotype: ♂ (NMNST), Mt. Dahan Shan, Chunri Township, Pingtung County, Taiwan, 15.VI.2007, W.-S. LIN leg. Paratypes (50 ♂♂, 42 ♀♀): 1 ♀ (allotype; NMNST), Mt. Dahan Shan, 27–28.VI.2013, W.-I CHOU leg.; 3 ♂♂, 1 ♀ (YL), same locality as the preceding, 26.VI.2005, Y.-L. LIN leg.; 2 ♂♂ (TN), same locality as the preceding, 6.VI.2004, W.-S. LIN leg.; 1 ♂, 1 ♀ (YL), same locality as the preceding, 19.VI.2004, K.-T. WANG leg.; 2 ♂♂, 1 ♀ (WC), same locality as the preceding but 1,300 m in altitude, 21.VII.2009, W.-I CHOU leg.; 6 ♂♂, 6 ♀♀ (WC), same as the preceding but 1,000 m in altitude, 10.VII.2010; 1 ♂, 2 ♀♀ (CC), same locality as the preceding without altitude, 8.VII.2010, C.-M. CHEN leg.; 2 ♂♂, 1 ♀ (WC), same locality as the preceding, 20.VII.2010, W.-I CHOU leg.; 1 ♂, 4 ♀♀ (WC & TN), same as the preceding, 23.VII.2010; 1 ♀ (WC), same as the preceding, 2.VIII.2011; 1 ♀ (WC), same as the preceding, 12.VIII.2011; 4 ♂♂, 4 ♀♀ (JC), same locality as the preceding without altitude, 19.VI.2013, J. F. CHEN leg.; 1 ♀ (CC), same locality as the preceding, 28.VI.2013, C.-M. CHEN leg.; 1 ♀ (WC), same as the preceding but 1,300 m in altitude, 13.VIII.2011; 14 ♂♂, 5 ♀♀ (WC), same locality as the preceding but 1,000 m in altitude, 27–28.VI.2013, W.-I. CHOU; 4 ♂♂, 1 ♀ (WC), same as the preceding, 20.VII.2014; 1 ♂ (TW), same locality as the preceding, 2.VI.2015, T. WAKEJIMA leg.; 3 ♂♂, 1 ♀ (TW), same as the preceding, 5.VI.2015; 1 ♂, 1 ♀ (SN), same locality as the preceding, 5.VI.2015, S. NAKAZATO leg.; 1 ♂ (SN), same as the preceding, 6.VI.2015; 2 ♀♀ (CC), same locality as the preceding, 16.VI.2015, C.-M. CHEN leg.; 1 ♂, 2 ♀♀ (WC), same locality as the preceding, 28.VI.2015, W.-I CHOU leg.; 1 ♂, 2 ♀♀ (WC), same as the preceding, 17.VII.2015; 1 ♀ (SN), same locality as the preceding, 5.VII.2017, S. NAKAZATO leg.; 1 ♂ (TN), Capou, Shizi Township, Pingtung County, 12.VI.2001, W.-S. LIN leg.; 1 ♂, 2 ♀♀ (WC), Mt. Gaoshifo Shan, 400 m in altitude, Mudan Township, Pingtung County, 9–10.V.2010, W.-I CHOU leg.

Distribution. Southern Taiwan (Pingtung County).

Etymology. The new name, *takakuwai* is derived from the last name of the late Dr. Masatoshi TAKAKUWA.

Comparative note. *Chlorophorus takakuwai* sp. nov. is slightly similar in the black maculation on elytra to *C. graphus* HOLZSCHUH, 1998 from “Sun Moon Lake” of Nantou County, central Taiwan. However, the new species has the quite different black maculation on the pronotum which shows an elongate pyriform median spot and a pair of large circular spots at sides, whereas *C. graphus* has a rather small arcuate spot at centre and a pair of small spots at sides.

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要 約

新里達也・周 文一：台湾南部の大漢山から発見されたクロトラカミキリ属(鞘翅目カミキリムシ科)の2新種。———クロトラカミキリ属はトラカミキリ族のなかでもっとも繁栄している一群で、旧北区や東洋区などから250種以上が知られるが、台湾からも17種の記録がある。本論文では、台湾中央山脈の最南端に位置する屏東縣の大漢山から得られた標本に基づき新たに2種を記載したが、このうちの1種に、2016年夏に急逝した高桑正敏博士に因み、*Chlorophorus takakuwai* sp. nov. と命名した。高桑博士とは、2013年5月初めにタイプ産地の大漢山に同道した思い出がある。

Chlorophorus dahanshanus sp. nov. (新中名：大漢山虎天牛) は、*C. verus* HOLZSCHUH, 1998 に前胸背板と上翅の黒紋が似ているが、基調となる被毛の色彩が、前胸背板と上翅基部付近で橙黄色、上翅先端3/4で明灰色になる特徴から容易に区別できる。いっぽう、*C. takakuwai* sp. nov. (新中名：高桑虎天牛) は、*C. graphus* HOLZSCHUH, 1998 に上翅の黒紋がやや似ているが、前胸背板の黒紋のうち中央紋が洋梨型、側縁紋は大きな円形となる特徴から区別が容易である。両新種ともに盛夏に成虫が出現する。

References

- HOLZSCHUH, C., 1998. Beschreibung von 68 neuen Bockkäfern aus Asien, überwiegend aus China und zur Synonymie einiger Arten (Coleoptera: Cerambycidae). *Schriftenreihe der Forstlichen Bundesversuchsanstalt (FBVA-Berichte), Wien*, **107**: 1–65.
- NAKAMURA, S., H. MAKIHARA, T. KURIHARA & J. YAMASAKO, 2014. Check-list of longicorn-beetles of Taiwan. *Miscellaneous Reports of the Hiwa Museum for Natural History, Shôbara*, (55): 1–277.
- TAVAKILIAN, J., & H. CHEVILLOTTE, [2017]. Titan database about Longhorns or Timber-Beetles Cerambycidae. [http://titan.gbif.fr/sel_genre2.php]. Accessed on 25 August 2017.

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