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Taxonomy of the *Cryptocephalus heraldicus* Group (Coleoptera: Chrysomelidae, Cryptocephalinae) from China

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Abstract: This is a study on the leaf beetle subgenus *Cryptocephalus* Geoffroy, 1762 from China, with the particular emphasis upon the species-group classification of the subgenus and the taxonomy of the *Cryptocephalus heraldicus* species group. A new key is compiled to all the species groups found in China. Four new species are described from China: *Cryptocephalus* (*Cryptocephalus*) *biordopunctatus* sp. nov. from Yunnan, *C. hani* sp. nov. from Shanxi, Hubei, Shaanxi and Gansu, *C. incisodentatus* sp. nov. from Sichuan and Yunnan, and *C. nigroflavusiventerus* sp. nov. from Yunnan. Three species are found for the first time in China: *C. lacosus* Pic, 1922, *C. nigriceps* Allard, 1891 and *C. rajah* Jacoby, 1908. The species *C. nigrolimbatus* Jacoby, 1890 is transferred from the subgenus *Burlinius* Lopatin to this subgenus and assigned to the *Cryptocephalus heraldicus* group. The species number of this group is now 30 in total according to our result of taxonomic review. A key to all the mainland China species of this species group is provided as well as high quality color images and line drawings of adult habitus, aedeagus, and other important structures. All the types of the new species are deposited in the collection of Institute of Zoology, Chinese Academy of Sciences (IZ-CAS).

Keywords: *Cryptocephalini*; distributional records; new species; taxonomy

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1. Introduction

The genus *Cryptocephalus* Geoffroy, 1762 (Coleoptera, Chrysomelidae, Cryptocephalinae, Cryptocephalini) is a megadiverse leaf beetle taxon which has a wide geographical distribution and is recorded in almost all zoogeographical regions of the world [1–4]. However, it has not been revised taxonomically in the past few decades [3]. Indeed, it is very difficult to revise the whole genus, a total of ca. 1800 species known up to now. There were many excellent works published with their attentions concentrated on regional faunas [2,4–8]. Even more works were listed in Schöller (2002) [3]. This paper is a continuous of our previous studies on this genus and its related groups from China.

Schöller (2002) gave a brief review of the classification of the genus *Cryptocephalus* Geoffroy; it listed a catalogue of ten subgenera in total and five of them were recorded to occur in China, namely, *Anteriscus* Weise, 1906, *Asionus* Lopatin, 1988, *Burlinius* Lopatin, 1965, *Cryptocephalus* nominative and *Heterichnus* Warchałowski, 1991 [3]. In this study, we focused on the subgenus *Cryptocephalus* which includes also *Cerodens* Burlini, 1969, a subgenus valid then in Schöller (2002) but now as a synonym of *Cryptocephalus* nominative by Sassi (2014) [3,9].

The genus *Cryptocephalus* Geoffroy, 1762 is an early established taxon and all its subgenera were erected much later, mostly for the fauna of the Palaearctic Region [3]. Even

though the genus was subdivided into different subgenera and many species were separated out of the subgenus *Cryptocephalus*, it is still a very large taxon even merely to the Chinese fauna. It was shown to be an effective approach to divide the species of this genus or subgenus into different species groups; this approach was used by many entomologists. For example, White (1969) studied the genus *Cryptocephalus* in America north of Mexico, including 71 species and 33 subspecies, and categorized them in 12 species groups according to the regular puncture rows on elytra and the coloration on pronotum and elytra [8]; Warchałowski (2010) revised the fauna of the Palaearctic Region and subdivided all the species into 11 species groups according to the body dorsal hairs, the elytral puncture rows, and the coloration of pronotum, elytra and legs [4].

For the genus *Cryptocephalus*, Chen (1942) revised 84 species (and subspecies) mainly occurred in China and divided them into three species groups: *C. regalis* group with obvious pubescence on the dorsal side (recently being treated almost all to the subgenus *Asionus*), *C. stchukini* group without pubescence but with irregular puncture rows on the elytra, and *C. trifasciatus* group without pubescence but with regular puncture rows on the elytra [5]. Gressitt and Kimoto (1961) revised 131 species from China and Korea and divided them also into three species groups [6]. Tan et al. (1980) followed Chen's species group classification [10].

In the present study, we tried to establish an easy-used species group classification and compiled a key to all the species groups of the subgenus *Cryptocephalus* from China. It may benefit the future study on the Chinese *Cryptocephalus* and the related taxa. We described also four new species which belong to the *Cryptocephalus heraldicus* group, namely, *Cryptocephalus* (*s. str.*) *biordoipunctatus* sp. nov. from Yunnan, *C.* (*s. str.*) *hani* sp. nov. from Shanxi, Hubei, Shaanxi, and Gansu, *C.* (*s. str.*) *incisodentatus* sp. nov. from Sichuan and Yunnan, and *C.* (*s. str.*) *nigroflavusiventerus* sp. nov. from Yunnan. Three species were found as new record to China: *C.* (*s. str.*) *lacosus* Pic, 1922 [11], *C.* (*s. str.*) *nigriceps* Allard, 1891 [12], and *C.* (*s. str.*) *rajah* Jacoby, 1908 [13]. Moreover, *C.* (*s. str.*) *nigrolimbatus* Jacoby, 1890 [14] was transferred from the subgenus *Burlinius* Lopatin, 1965 to this one and assigned to this species group [14]. Finally, the total species number of the *Cryptocephalus heraldicus* group is thus 34 based on the present study and all the Chinese species are listed in the paper.

2. Materials and Methods

Dissection and photography: dried specimens were relaxed in hot water at 80 °C for about 2 h, to soften the beetle body and ease dissection. The abdomen was separated with insect pins from the rest of the body, soaked in 10% KOH solution and heated in a water bath for 15 min to advance the process, and then transferred into distilled water to rinse the residual KOH solution off and stop the bleaching process. Afterwards, the aedeagus, spermatheca and rectal sclerites were prepared. The dissected parts were placed in glycerin for observation and measurement with an apochromatic stereomicroscope Zeiss SteREO V12. Color pictures of the adults and genitalia were captured with an Axio Zoom. V16 fluorescence stereo zoom microscope, and photomontage was performed in Zen 2012 (blue edition) imaging software. Adobe Photoshop CS6 was used in digital post-processing of the color pictures, and Adobe Illustrator 2020 was used to make the line drawings.

Measurements are average values calculated from the values of at least five specimens, or all available specimens in case less than five specimens were available. The following abbreviations are used in the text to indicate the measurements of the specimens:

BL body length (length from the apex of pronotum to the apex of elytra in dorsal view);
BW body width (distance between the humeri, maximal body width);
HL head length (length from occiput to the front apex of mandibles);
HW head width (distance between the eyes, width of maximal head width);
PL pronotal length (length from the basal angle to anterior margin, maximal longitudinal length of pronotum);
PW pronotal width (distance of the widest portion of the pronotum);
EL elytral length (length of the maximal elytral length in dorsal view);

AL aedeagus length (length from the apex of aedeagus to the basal margin, maximal aedeagus length);
AW aedeagus width (the maximal width of aedeagus);
SL spermathecal length (length of the maximal spermathecal length, without duct).

Type specimens of the new species and other materials included in this study are preserved at the Institute of Zoology, Chinese Academy of Science, Beijing, China (IZ-CAS). The following abbreviations list out the institutions of holotype deposition:

BMNH The Natural History Museum, London, UK;
MNHN National Museum of Natural History, Paris, France.

3. Results

3.1. Taxonomy of the Subgenus Cryptocephalus

Geoffroy, 1762: 231 (nom. nud.); Fabricius, 1801: 42 (type: *Chrysomela decemmaculata* Linnaeus); Curtis, 1824: no. 35, pl. 35 (type designated as *Chrysomela sericea* Linnaeus; Europe); Chen, 1942: 109 (part); Gressitt and Kimoto, 1961: 121 (part); Lopatin et al., 2010: 589 (Palaearctic region) [2,5,6,15–17].

Syn.: *Chrysocryptocephalus* Steinhausen, 2007: 31 (As subgenus of *Cryptocephalus*); Schöller, 2010: 80 (obj. syn.). Type species: *Chrysomela sericea* Linnaeus, 1758 [18–20].

Cerodens Burlini, 1969: 539; Sassi, 2014: 335 (Synonymized). Type species: *Cryptocephalus kocheri* Burlini, 1949 (= *Cryptocephalus emiliae* Burlini, 1954) [9,21,22].

Type species: *Chrysomela sericea* Linnaeus, 1758.

As a megadiverse leaf beetle group from China, the subgenus *Cryptocephalus* includes now only those species which have not been separated out of this group and not been categorized to the other subgenera either, namely, *Anteriscus* Weise, 1906 [23], *Asionus* Lopatin, 1988 [24], *Burlinius* Lopatin, 1965 [25], and *Heterichnus* Warchałowski, 1991 [26]. The reason is that the genus *Cryptocephalus* Geoffroy, 1762 [15] was an early-established taxon and all its subgenera were erected much later [3]. With respect to so large a taxon of many species and difficulty in species identification, we tried here to establish an user friendly species group classification and compiled a key to all the species groups of the subgenus *Cryptocephalus s. str.* from China, based on a reevaluation of the characters which were used in species group classification by Chen (1942) [5], Gressitt and Kimoto (1961) [6], and Warchałowski (2010) [4].

This subgenus is closely related to the genus *Melixanthus* Suffrian, 1854 [27], but the antennae of the latter are shorter than half of the body and the terminal antennal segments are usually thickened. This subgenus is also similar to the subgenus *Burlinius* Lopatin, 1965 [25], but this taxon has a larger-sized body and the relatively larger head and eyes, with aedeagus not prolonged into two or three processes with all the species. The subgenus is also similar to the subgenus *Asionus* Lopatin, 1988 [24], but the latter with erect hairs on elytra (at least on posterior part) and their last tarsomere free with terminal 2/3. With respect to the subgenus *Heterichnus* Warchałowski, 1991 [26], they can be distinguished by the following characters: *Heterichnus* has the male fore legs prolonged and the tarsi more or less flattened and prolonged [4].

3.2. Key to the Species Groups of the Subgenus Cryptocephalus from China

1. Elytral punctures irregular; if partly regular, then in more than 11 rows, and often in pairs of rows ····· 2
- Elytral punctures in 11 regular rows ····· 3
2. Dorsal side usually metallic, rarely black, the margins sometimes bordered with whitish yellow or yellowish red ····· *C. hypochoeridis* group
- Elytron with pale and dark markings, or pronotum red or yellow with black patches ····· *C. sexpunctatus* group
3. Pronotum distinctly punctate ····· *C. parvulus* group
- Pronotum smooth and shining, impunctate or with extremely fine punctures ····· 4
4. Dorsal side partly metallic, usually elytron entirely metallic ····· *C. discoderus* group

- Dorsal side without above characteristics ·····5
5. Pronotum entirely black, sometimes hind angle with whitish yellow or yellowish red ·····*C. anticus* group
- Pronotum without above characteristics ·····6
6. Pronotum entirely pale, reddish, testaceous, yellowish or brownish, apart from black posterior margin (and sometimes also very narrowly blackened lateral marginal ridge) without any well-defined black pattern, at most with great, blurred, brownish spot(s) ·····*C. heraldicus* group
- Pronotum bicolorous, apart from black posterior margin (and sometimes also very narrowly blackened lateral marginal ridge), and marking(s) well defined ····· 7
7. Ground color of pronotum black, and with yellow or reddish-brown marking(s) ·····*C. exsulans* group
- Ground color of pronotum yellow or reddish brown, and with black marking(s) ·····*C. trifasciatus* group

3.3. The Cryptocephalus heraldicus Species Group

3.3.1. Diagnosis and Species Included

Diagnosis. Medium-sized species (3.2–5.0 mm), with dorsal side glabrous, not metallic; pronotum entirely pale, reddish, testaceous, yellowish or brownish, apart from black posterior margin (and sometimes also very narrowly blackened lateral marginal ridge), without any well-defined black pattern, at most with great, blurred, brownish spot(s) [4]. Pronotum impunctate or with extremely fine punctures under a high-power lens. Elytra regularly punctate.

According to our studies after checking the specimens maintained at IZ-CAS, and for some species, the literatures concerned, we included in this species group the following 30 species listed below (of them, 22 known before this study, 3 new country records to China, 1 from the subgenus Burlinius, and 4 new species described here):

Cryptocephalus (Cryptocephalus) auripennis Chûjô, 1934 [28]
Cryptocephalus (C.) bicoloripennis Chûjô, 1934 [28]
Cryptocephalus (C.) brevebilineatus Pic, 1922 [29]
Cryptocephalus (C.) brunneopunctatus Pic, 1922 [30]
Cryptocephalus (C.) chinensis Jacoby, 1888 [31]
Cryptocephalus (C.) gestroi Jacoby, 1892 [32]
Cryptocephalus (C.) hainanicus Gressitt, 1942 [33]
Cryptocephalus (C.) heraldicus Suffrian, 1854 [27]
Cryptocephalus (C..) hiro Chûjô, 1954 [34]
Cryptocephalus (C.) jani Medvedev, 2011 [35]
Cryptocephalus (C.) kiyoyamai Kimoto, 1974 [36]
Cryptocephalus (C.) lanpingensis Tan, 1992 [37]
Cryptocephalus (C.) lentiginosus Tan, 1992 [37]
Cryptocephalus (C.) lofgrenae Gressitt and Kimoto, 1961 [6]
Cryptocephalus (C.) luteosignatus Pic, 1922 [11]
Cryptocephalus (C.) mouton Pic, 1922 [11]
Cryptocephalus (C.) nitidissimus Chûjô, 1934 [31]
Cryptocephalus (C.) ohnoi Kimoto, 1983 [32]
Cryptocephalus (C.) solingensis Gressitt and Kimoto, 1961 [6]
Cryptocephalus (C.) subunicolor Gressitt, 1942 [25]
Cryptocephalus (C.) tubu Chûjô, 1954 [38]
Cryptocephalus (C.) weigeli Medvedev, 2015 [39]
Cryptocephalus (C.) lacosus Pic, 1922 (New country record to China) [11]
Cryptocephalus (C.) nigriceps Allard, 1891 (New country record to China) [12]
Cryptocephalus (C.) nigrolimbatus Jacoby, 1890 (stat. nov.) [14]
Cryptocephalus (C.) rajah Jacoby, 1908 (New country record to China) [13]
Cryptocephalus (C.) biordopunctatus Duan, Wang and Zhou, sp. nov.

Cryptocephalus (C.) hani Duan, Wang and Zhou, sp. nov.
Cryptocephalus (C.) incisodentatus Duan, Wang and Zhou, sp. nov.
Cryptocephalus (C.) nigroflavusiventerus Duan, Wang and Zhou, sp. nov.

3.3.2. Key to Species of *Cryptocephalus heraldicus* Group from Mainland China

1. Elytron entirely pale, reddish, testaceous, yellowish or brownish, apart from black margins ····2
- Elytron not entirely pale, usually with black or other pale markings, apart from black margins ····14
2. Underside entirely pale, sometimes slightly darker than pronotum, without any black region ····3
- Underside entirely black, or pale but some region tinged with black ····9
3. Elytron paler than pronotum ····4
- Elytron and pronotum nearly with the same color ····5
4. Body slightly large, 3.6–4.0 mm; clypeus impunctate, vertex distinctly punctuate ····*C. jani* Medvedev
- Body slightly small, 3.0–3.4 mm; clypeus sparsely punctate, vertex impuncrate ····*C. incisodentatus* sp. nov.
5. Elytron with coarse and deep punctures which surrounded by dark ring ····*C. brunneopunctatus* Pic
- Elytron with slightly fine punctures, and not surrounded by dark ring ····6
6. Elytron interval of puncture rows differs alternately ···· *C. biordopunctatus* sp. nov.
- Elytron without above characteristics ····7
7. Antennae yellowish brown on first four segments, black on last seven ····8
- Antennae entirely yellowish brown; eyes less widely separated than antennal insertions ····*C. subunicolor* Gressitt
8. Body large; eyes separated as long as antennal insertions; scutellum smooth, heart shaped, strongly acute apically ····*C. gestroi* Jacoby
- Body small; eyes more widely separated than antennal insertions; scutellum minutely punctures at sides, foveate basally and subacute apically ···· *C. hainanicus* Gressitt
9. Claws with teeth ····*C. nigroflavusiventerus* sp. nov.
- Claws without teeth ····10
10. Underside entirely or largely black ····11
- Underside largely pale but some region tinged with black ····13
11. Head entirely black, frons with long and silvery pubescence ···· *C. nigriceps* Allard
- Head yellowish or reddish brown, frons without pubescence ····12
12. Eyes more widely separated than antennal insertions ···· *C. lentiginosus* Tan
- Eyes less narrowly separated than antennal insertions ····*C. hani* sp. nov.
13. Body slightly small, 3.3–3.5 mm; elytron widest near base; scutellum heart shaped ····*C. lofgrenae* Gressitt and Kimoto
- Body slightly large, 3.8–4.3 mm, elytron widest near apex; scutellum trapezoidal shaped ····*C. nigrolimbatus* Jacoby
14. Underside entirely pale, sometimes slightly darker than pronotum, without any black region ····15
- Underside entirely black, or pale but some region tinged with black ····19
15. Vertex and frons with coarse and dense punctures; elytron black, with a broad yellowish band slightly behind middle ···· *C. bicoloripennis* Chûjô
- Vertex and frons without punctures or with sparse punctures; elytron yellow or reddish brown ····16
16. Elytron yellow with margin, a spot on humerus and a narrow transverse band behind middle, black ····*C. chinensis* Jacoby
- Elytron reddish brown, without above characteristics ····17

17. Elytron pale fulvous, all margins narrowly and stripe on the 4th interspace, shortened posteriorly, black with black stripes ····· *C. weigeli* Medvedev
- Elytron without above characteristics ····· 18
18. Elytron reddish brown, humeral, postmedian, and lateroposterior markings smaller, in some specimens postmedian and lateroposterior markings lacking ····· ····· *C. lacosus* Pic
- Elytron marked with large black reticulations, leaving six pale spots (3:2:1) or five (2:2:1) ····· *C. luteosignatus* Pic
19. Body longer than 3 mm in length ····· 20
- Body smaller than 3 mm in length ····· 22
20. Elytral epileuron heavily punctured; elytral interspaces strongly raised; elytron darkish brown, with a broad yellowish band slightly behind middle ····· ····· *C. moutoni* Pic
- Elytron without above characteristics ····· 21
21. Body slightly small, 3.2–3.4 mm; elytron yellow, with black stripe terminating in a broad band just behind middle, which joins suture but not external margin, but sometimes continuing posteriorly beyond transverse band; or extending from basal margin nearly to apex ····· *C. brevebilineatus* Pic
- Body large, 4.7 mm; elytron reddish brown, a black spot on humerus and near apex ····· *C. rajah* Jacoby
22. Scutellum black, elytron yellowish brown, with a narrow and black stripe along sutural margin ····· *C. heraldicus* Suffrian
- Scutellum yellow, elytron without above characteristics ····· 23
23. Elytron black, apical 1/4 of elytron lightly yellow ····· *C. lanpingensis* Tan
- Elytron testaceous with basal 2/5 almost entirely blackish but becoming pitchy brown on posterior portion of area, and with a large rounded squarish spot on most of apical 1/3 ····· *C. solingensis* Gressitt and Kimot

3.4. Descriptions of Four New Species

3.4.1. *Cryptocephalus (Cryptocephalus) biordopunctatus* Duan, Wang and Zhou, sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:314CBEB6-DF07-4951-ADC8-5819492EBCA5

Figures 1, 2 and 9.

Type locality. China: Yunnan Province: Mojiang.

Type material examined. Holotype: male, CHINA: Yunnan Province: Mojiang, southwest 50 km, 30. III. 1955, coll. Krejanovski (IZ-CAS). Paratypes: CHINA: Yunnan Province: 1 female, Mojiang, southwest 50 km, 29. III. 1955, coll. B. Popov (IZ-CAS); 1 male, Mojiang, southwest 50 km, 1. IV. 1955, coll. Krejanovski (IZ-CAS); 1 male, 2 females, Mojiang, southwest 50 km, 2. IV. 1955, coll. B. Popov (IZ-CAS); 1 male, Pu'er, 19. IV. 1955, coll. Yufeng Xue (IZ-CAS); 1 male, Puer, 19. IV. 1955, coll. B. Popov (IZ-CAS); 1 male, Puer, 19. IV. 1955, coll. Yicai Zhao (IZ-CAS); 1 male, Jingdong, 1. V. 1982, coll. Subai Liao (IZ-CAS); 1 male, 1 female, Jingdong, Western Mountain, 23. III. 1957, coll. Zenghao Zhu (IZ-CAS); 1 female, Jingdong, Hedong street, 30. III. 1957, coll. Zenghao Zhu (IZ-CAS); 1 female, Jingdong, 5. III. 1957, coll. Zenghao Zhu (IZ-CAS); 3 females, Jingdong, 23. III. 1957, coll. Zenghao Zhu (IZ-CAS); 1 female, Jingdong, northeast 22 km, 9. V. 1957, coll. A. Menchatski (IZ-CAS); 1 female, Jingdong, northeast 1440 m, 25. V. 1956, coll. Tiantong Huang (IZ-CAS); 1 female, Jingdong, Dongjia grave, 26. VI. 1957, coll. Krejanovski (IZ-CAS); 1 male, Laojiezi, 22. V. 1957, coll. Zenghao Zhu (IZ-CAS).

Measurements. BL = 4.28–4.94 mm, BW = 2.70–3.06 mm, HL = 1.17 mm, HW = 1.22 mm, PL = 1.34 mm, PW = 2.75 mm, EL = 3.44 mm, AL = 1.62 mm, AW = 0.42 mm, SL = 0.56 mm.

Description. Body (Figure 1A,B) medium size, pale ochraceous. Head testaceous, vertex with a narrow and weakly brown vertical stripe; apex of mandibles darkish brown; antennae yellowish brown on first four segments, reddish brown on last seven. Pronotum slightly ochraeous, basal margin black. Scutellum lightly yellow, with darkish brown basal

margin. Elytron yellowish brown, basal margin reddish brown. Ventral surface of body and legs yellowish brown, claws black.

Head less than one-half as broad as prothorax, nearly round in frontal outline and smooth, very sparsely and indistinctly punctate, vertex with a longitudinally shallow groove. Eyes emarginated below middle, superior eye-lobes separated slightly wider than antennal insertions. Clypeus impunctate, anterior margin slightly concave. Antennae of male longer and thicker than female, reaching apical 1/4 of elytra; 1st segment thick, clubbed, 2nd spherical, 2/5 as long as 1st, 3rd slender, about 1.5 times as long as 2nd, 4th slender slightly longer than 3rd, shorter than 5th, 6th longer than 5th, from 6th segment on somewhat equal in length, 5th–8th broadened and flatted, and last segment pointed apically.

Pronotum (Figure 1A,B) convex, smooth, and shining, nearly 1/2 as long as broad, trapezoidal from dorsal view; anterior margin straight in anterodorsal view; basal margin weakly sinuate, obtuse and truncate on middle; disc evenly convex, smooth, impunctate. Scutellum heart-shaped, wider than length, narrowed and slightly rounded apically, sloping upward apically, smooth and impunctate.

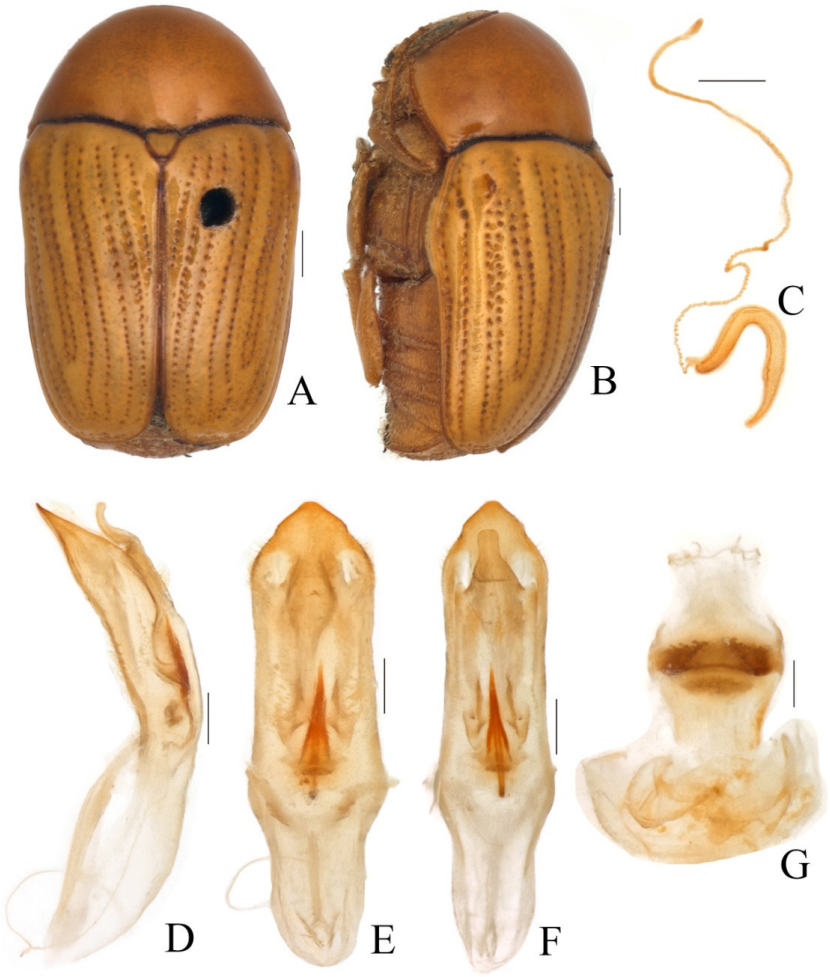

Figure 1. *Cryptocephalus* (*Cryptocephalus*) *biordopunctatus* Duan, Wang and Zhou, sp. nov.: (**A**). habitus; (**B**). lateral view of habitus; (**C**). spermatheca; (**D**). lateral view of aedeagus; (**E**). ventral view of aedeagus; (**F**). dorsal view of aedeagus; (**G**). rectal pad. (Scale bars: **A**–**B** = 0.5 mm, **C**–**G** = 0.2 mm).

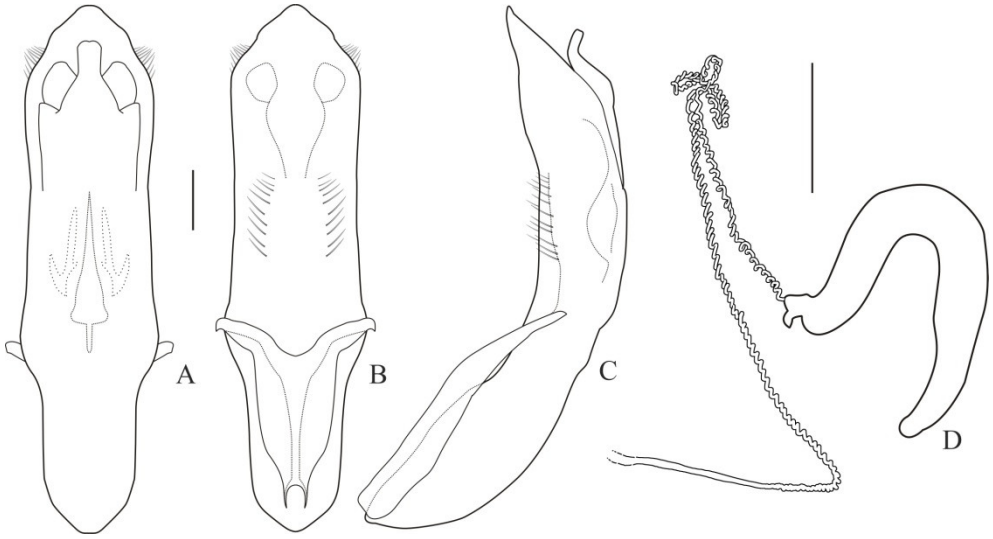

Figure 2. *Cryptocephalus* (*Cryptocephalus*) *biordopunctatus* Duan, Wang and Zhou, sp. nov.: (**A**). dorsal view of aedeagus; (**B**). ventral view of aedeagus; (**C**). lateral view of aedeagus; (**D**). spermatheca. (Scale bars: **A**–**D** = 0.2 mm).

Elytron (Figure 1A,B) slightly more than two times as long as broad, humeri somewhat prominent, glabrous, rounded-truncate apically. Disc of each with eleven somewhat oblique rows of fairly deep punctures, interval of puncture rows that differs alternately, interspaces with extremely fine punctures.

Ventral surfaces of body with rather closely fine punctures and shortly pale pubescence. Prosternum rectangular, surface uneven, central of anterior margin triangularly protruding, posterior margin with a pair of lobes. Mesosternum broad, width about 2.2 times of length, surface coarse, posterior surface slightly concave. The middle part of metasternum wrinkled. Pygidium with densely fine punctures and short pubescence.

Aedeagus (Figures 1D–F and 2A–C) elongate, sword-shaped, about 3.9 times as long as wide. Apex of median lobe triangular, slightly narrower than middle, round at apex, moderately curved in lateral view; with several pubescence on each side of apex, impunctate. Median orifice with median sclerite bending inwards below surface. Inner sac rather slender, triangular. Tegmen Y-shaped, moderately sclerotized.

Female. Body more robust than male; antennae shorter and thinner than male, reaching apical 2/3 of elytra; posterior margin of pygidium more rounded. Spermatheca (Figures 1C and 2D) thin, hook-shaped, acute-angled bending nearly 2/3 from apex, very acute at apex; duct weakly sclerotized, irregularly coiling. Rectal sclerites (Figure 1G) weakly sclerotized, not connected between two rectangular sclerites on ventral side.

Distribution. China (Yunnan) (Figure 9).

Differential Diagnosis. This new species is similar to *C.* (*s. str.*) *gestroi* Jacoby [32], but can be distinguished from the latter by the interval of puncture rows that differs alternately, by the pronotum narrower and by the aedeagus of males with pubescence on ventral part.

Etymology. The specific epithet is from the Latin words "*bi*, *ordo*," and "*punctatus*", to indicate the appearance of elytra.

3.4.2. *Cryptocephalus (Cryptocephalus) hani* Duan, Wang and Zhou, sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:3E90E719-AED5-4D4C-867B-2DCE681788FC

Figures 3, 4 and 9.

Type locality. China: Hubei Province: Shennongjia, Songbai.

Type material examined. Holotype: male, CHINA: Hubei Province: Shennongjia, Songbai, 7. VI. 1981, coll. Yinheng Han (IZ-CAS). Paratypes: CHINA: Shanxi Province: 1 male, Huoxian, Qiliyu, 31. VII. 1972, coll. Shuyong Wang (IZ-CAS); Shaanxi Province:

1 male, Huanglongshan, 17. VII. 1979, coll. Zongrang Qian (IZ-CAS); Gansu Province: 1 female, Kangxian, Heimaguan, 13. VII. 1998, coll. Shuyong Wang (IZ-CAS).

Measurements. BL = 4.50–5.09 mm, BW = 2.62–2.96 mm, HL = 1.38 mm, HW = 1.4 mm, PL = 1.52 mm, PW = 2.52 mm, EL = 3.48 mm, AL = 2.06 mm, AW = 0.54 mm, SL = 0.73 mm.

Description. Body (Figure 3A,B) ochraceous. Head ochraceous, vertex with a narrow reddish brown vertical stripe; labrum yellow; mandibles reddish brown, apex darkish brown; antennae yellowish brown on first four segments, darkish brown on last seven. Pronotum slightly pale yellowish testaceous, with black basal margin. Scutellum ochraceous, anterior and posterior margins black, lateral margins brown. Elytron ochraceous, with black basal margins. Ventral surface of body black, propleura and mesopleura yellowish brown; lateral side of abdomen, pygidium and legs yellowish brown, 1/3 basal part of tibia and tarsi black.

Head more than one-half as broad as prothorax, nearly round in frontal outline, surface uneven, wrinkled; vertex with a longitudinally groove; frons with silver pubescence. Eyes emarginated below middle, superior eye-lobes separated slightly narrower than antennal insertions. Clypeus impunctate, wrinkled, anterior margin slightly concave. Antennae of male long and thin, reaching apical 1/5 of elytra; 1st segment thick, clubbed, 2nd spherical, 1/3 as long as 1st, 3rd slender, about two times as long as 2nd, 4th slender, about equal with 1st, shorter than 5th, from 5th segment on somewhat equal in length, 5th–8th broadened and flatted, and last 3 segments long and thin.

Pronotum (Figure 3A,B) convex, smooth, and shining, nearly 0.6 as long as broad, trapezoidal from dorsal view; anterior margin straight in anterodorsal view; lateral margin convex, 1/2 basal part can be seen in dorsal view; basal margin weakly sinuate, obtuse and truncate on middle; disc evenly convex, smooth, finely punctate. Scutellum trapezoidal, wider than length, basal margin truncate, sloping upward apically, smooth and impunctate.

Elytron (Figure 3A,B) about 2.2 times as long as broad, humeri somewhat prominent, glabrous, and rounded-truncate apically. Disc of each with eleven somewhat oblique rows of fairly deep punctures, slightly confused at lateral region; interspaces without any punctures.

Ventral surfaces of body with rather dense punctures and shortly silver pubescence. Prosternum trapezoidal, longer than wide, surface uneven, central of anterior margin triangularly protruding, lateral ridges slightly elevated, posterior margin with a pair of lobes. Mesosternum broad and small, square. The middle part of metasternum glabrous, with sparsely coarse punctures. Pygidium with densely fine punctures and short pubescence. The first tarsi of front and middle legs distinctly broader and longer than hind legs.

Aedeagus (Figures 3C–E and 4A–C) elongate, about 3.8 times as long as wide. Apex of median lobe arcuate, slightly narrower than middle, round at apex, weakly curved in lateral view; with several pubescence on each side of apex, impunctate. Median orifice with median sclerite bending inwards below surface. Inner sac rather bilobed. Tegmen Y-shaped, moderately sclerotized.

Female. Body more robust than male; antennae slightly shorter than male, posterior margin of pygidium more broadened and rounded. Spermatheca (Figure 4D) hook-shaped, acute-angled bending nearly 1/3 from apex, very acute at apex; duct weakly sclerotized, irregularly coiling. Rectal sclerites (Figure 3F) strongly sclerotized, connected between two rectangular sclerites on ventral side.

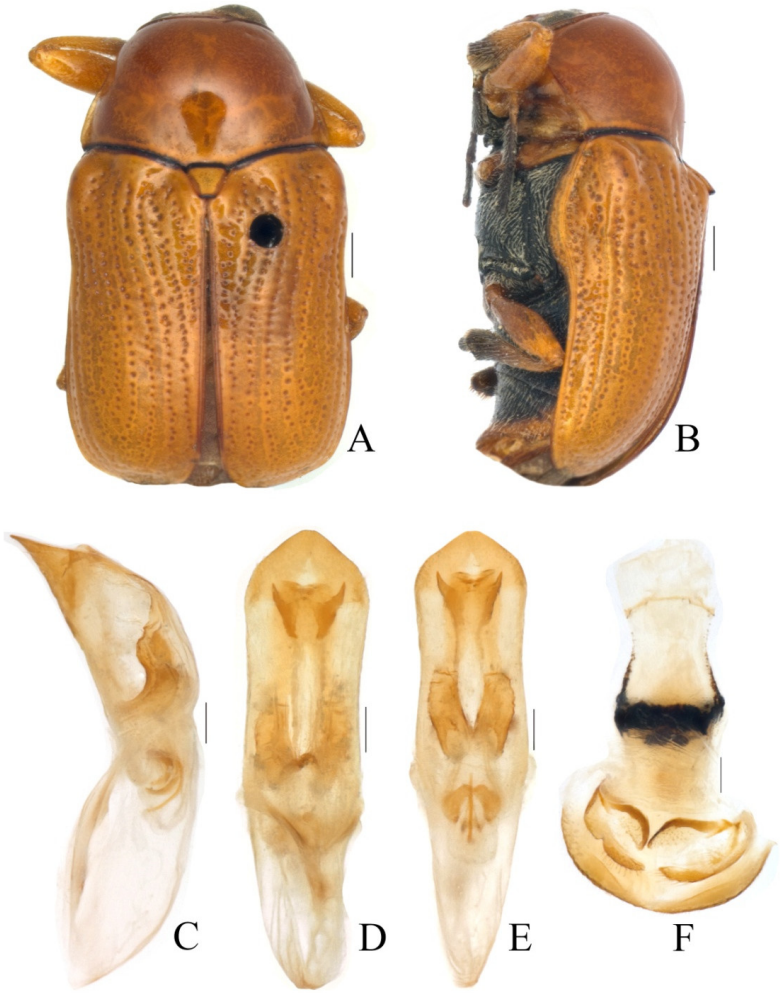

Figure 3. *Cryptocephalus* (*Cryptocephalus*) *hani* Duan, Wang and Zhou, sp. nov.: (**A**). habitus; (**B**). lateral view of habitus; (**C**). lateral view of aedeagus; (**D**). ventral view of aedeagus; (**E**). dorsal view of aedeagus; (**F**). rectal pad. (Scale bars: **A**,**B** = 0.5 mm, **C**–**F** = 0.2 mm).

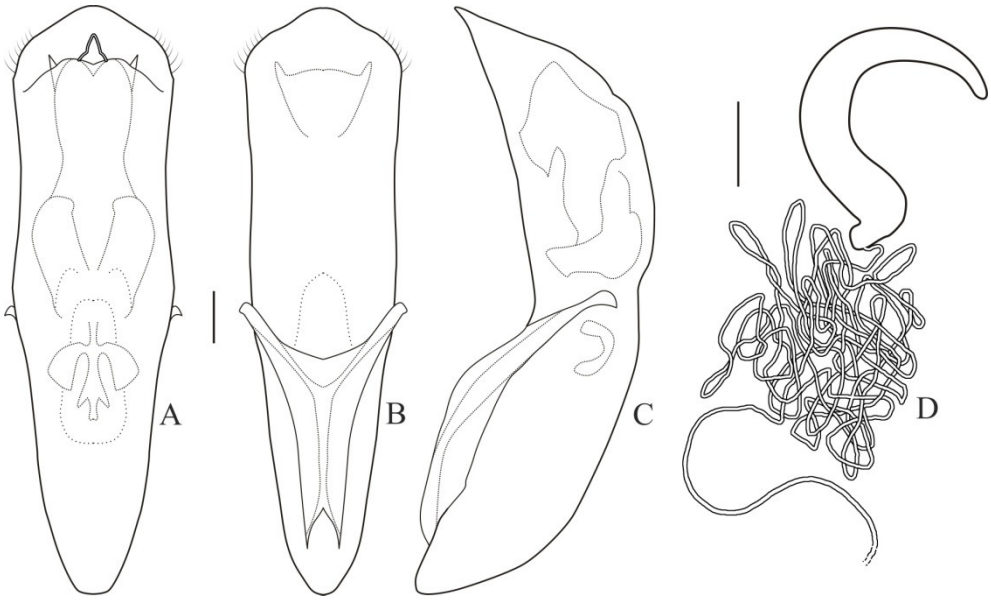

Figure 4. *Cryptocephalus* (*Cryptocephalus*) *hani* Duan, Wang and Zhou, sp. nov.: (**A**). dorsal view of aedeagus; (**B**). ventral view of aedeagus; (**C**). lateral view of aedeagus; (**D**). spermatheca. (Scale bars: **A**–**D** = 0.2 mm).

Distribution. China (Shanxi, Hubei, Shaanxi, Gansu) (Figure 9).

Differential Diagnosis. This new species is similar to *C.* (*s. str*) *licenti* Chen [5], but can be distinguished from the latter by the elytra in an ochraceous coloration and with the basal margin black, while the latter with darkly reddish brown elytra and sutural margin black. The female of new species has thinner duct which coils under thirty times.

Etymology. The specific epithet is named in memory of the holotype collector, Mr. Han Yinheng.

3.4.3. *Cryptocephalus (Cryptocephalus) incisodentatus* Duan, Wang and Zhou, sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:CA3F3C77-30D3-477D-8909-3D3F6836D9A9

Figures 5, 6 and 9.

Type locality. China: Sichuan Province: Luding, Moxi.

Type material examined. Holotype: male, CHINA: Sichuan Province: Luding, Moxi, 18. VI. 1983, coll. Shuyong Wang (IZ-CAS). Paratypes: CHINA: Sichuan Province: 1 female, Luding, Moxi, 18. IX. 1982, coll. Shuyong Wang (IZ-CAS); 1 male, Luding, Moxi, 17. VI. 1983, coll. Shuyong Wang (IZ-CAS); 1 female, Emeishan, Longchi town, 23. IV. 2983, coll. Shuyong Wang (IZ-CAS); 1 female, Dechang, Liusuo, 12. VI. 1983, coll. Dingxi Liao (IZ-CAS); Yunnan Province: 1 female, Kunming, 21. V. 1941, coll. unknown (IZ-CAS); 1 male, Lijiang, 2. VIII. 1979, coll. Huanguang Zou (IZ-CAS).

Measurements. BL = 3.02–3.41 mm, BW = 0.66–1.87 mm, HL = 0.90 mm, HW = 1.00 mm, PL = 1.07 mm, PW = 1.78 mm, EL = 2.33 mm, AL = 0.91 mm, AW = 0.26 mm, SL = 0.43 mm.

Description. Body (Figure 5A,B) small, ochraceous, testaceous on pronotum. Head ochraceous, vertex with a narrow reddish brown vertical stripe; antennal insertions and anterior margin of clypeus reddish brown; mandibles black. Basal margin of pronotum and margins of elytron black, and sutural, lateral, apical margins of elytron tinted with reddish brown. Scutellum black, disc with some darkish red. Ventral surface of body reddish brown, legs yellowish brown.

Head more than one-half as broad as prothorax, nearly round in frontal outline; smooth and shiny, very sparsely and finely punctate; vertex with a longitudinally narrow groove; frons with sparsely long pubescence. Eyes emarginated below middle, superior eye-lobes separated less wide than antennal insertions. Clypeus with sparse punctures, anterior margin slightly concave. Antennae of males longer and thicker than females, reaching apical region of elytra; 1st segment thick and long, clubbed, 2nd oblong, 2/5 as long as 1st, 3rd–5th slender, 3rd about 1.5 times as long as 2nd; 4th slightly longer than 3rd, shorter than 5th, 6th longer than 5th, from 6th segment on somewhat broad and equal in length.

Pronotum (Figure 5A,B) convex, smooth, near 2/3 as long as broad, trapezoidal from dorsal view; anterior margin nearly straight; basal margin weakly sinuate, serrate and truncate on middle, and with a pair of deeply semi-circular notches nearly hind angles; disc evenly convex, impunctate. Scutellum triangular, longer than wide; middle part of anterior margin slightly concave, narrowed and slightly round apically, sloping upward apically, smooth and impunctate.

Elytron (Figure 5A,B) nearly 2.5 times as long as broad, with weakly prominent humeri, parallel-sided, rounded-truncate apically. Disc of each with eleven regular rows of punctures, without any punctures between rows.

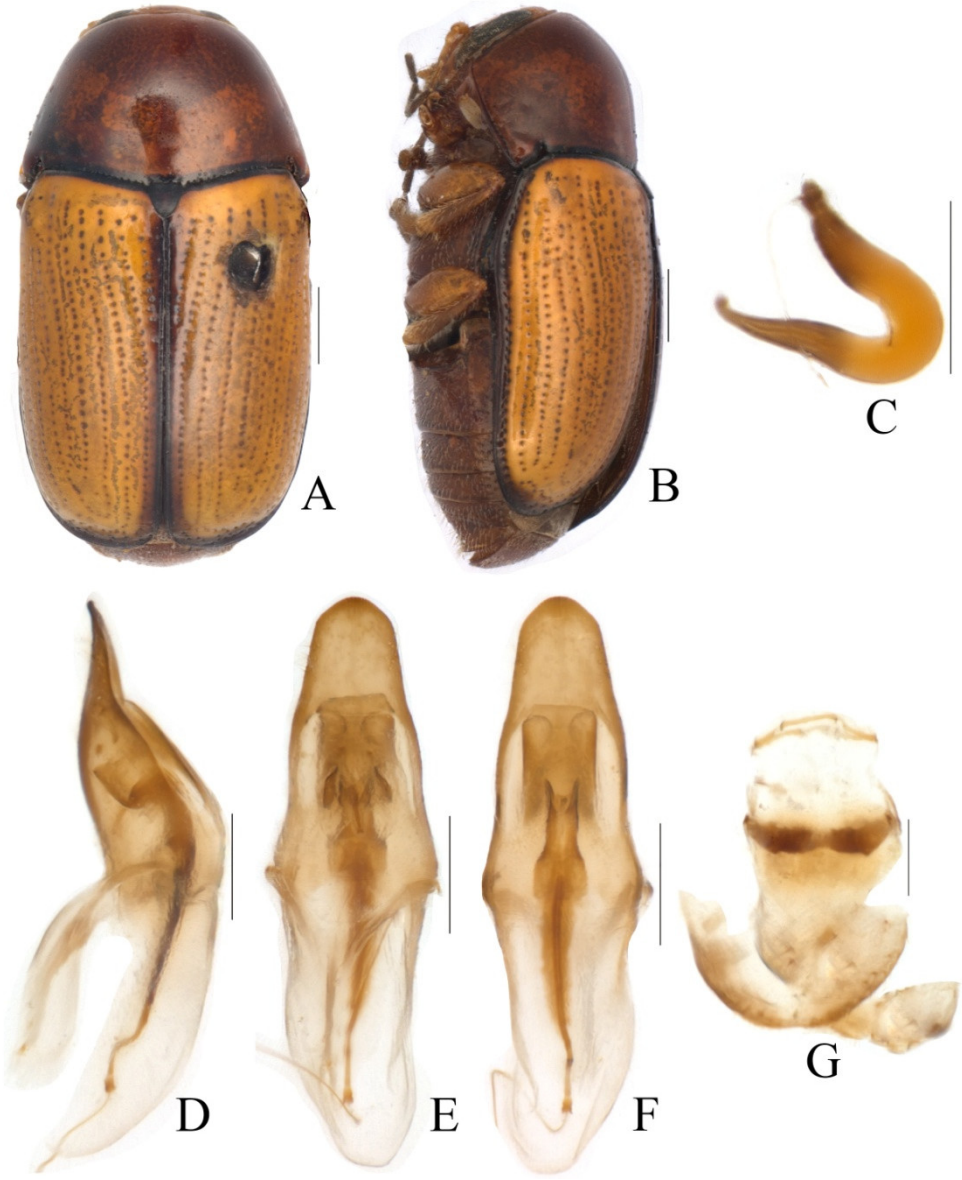

Figure 5. *Cryptocephalus* (*Cryptocephalus*) *incisodentatus* Duan, Wang and Zhou, sp. nov.: (**A**). habitus; (**B**). lateral view of habitus; (**C**). spermatheca; (**D**). lateral view of aedeagus; (**E**). ventral view of aedeagus; (**F**). dorsal view of aedeagus; (**G**). rectal pad. (Scale bars: **A**–**B** = 0.5 mm, **C**–**G** = 0.2 mm).

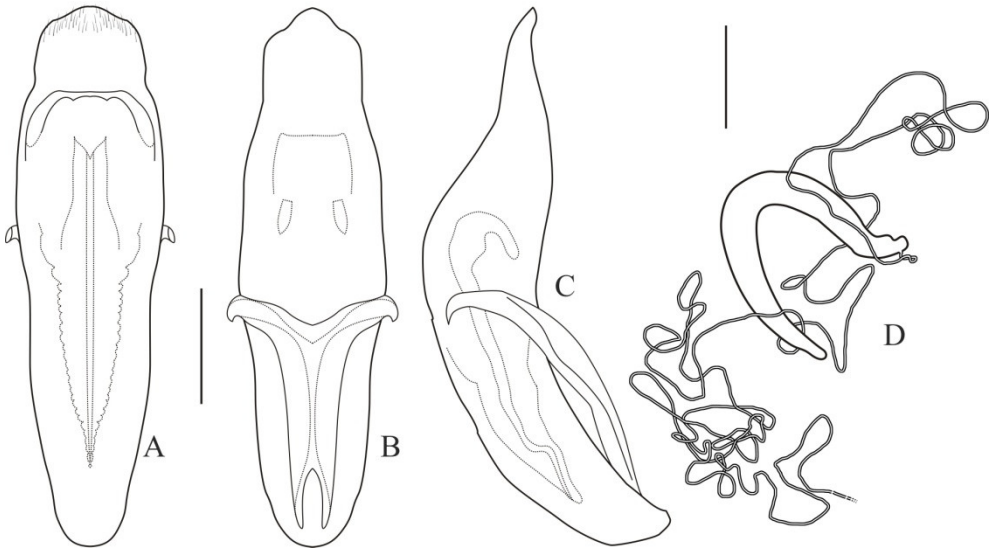

Figure 6. *Cryptocephalus* (*Cryptocephalus*) *incisodentatus* Duan, Wang and Zhou, sp. nov.: (**A**). dorsal view of aedeagus; (**B**). ventral view of aedeagus; (**C**). lateral view of aedeagus; (**D**). spermatheca. (Scale bars: **A**–**D** = 0.2 mm).

Ventral surfaces of body with rather closely fine punctures and densely short pubescence. Prosternum rectangular, surface uneven, posterior margin straight and with long pubescence. Mesosternum small, rectangular, width about 1.3 times of length, surface coarse. Middle part of metasternum wrinkled. Pygidium with dense punctures and short pubescence.

Aedeagus (Figure 5D–F and Figure 6A–C) elongate, about 3.5 times as long as wide. Apex of median lobe nearly round, slightly narrower than middle, moderately curved in lateral view; with several pubescence on each side of apex, and with sparse punctures. Median orifice with median sclerite bending inwards above surface. Inner sac long and take almost 2/3 of total aedeagus. Tegmen Y-shaped, moderately sclerotized.

Female. Body more robust than male; antennae shorter and thinner than male, reaching middle part of elytra; posterior margin of pygidium more rounded. Spermatheca (Figures 5C and 6D) hook-shaped, acute-angled bending nearly 1/2 from apex, very acute at apex; duct weakly sclerotized, irregularly coiling. Rectal sclerites (Figure 5G) moderately sclerotized, not connected between two rectangular sclerites on ventral side.

Distribution. China (Sichuan, Yunnan) (Figure 9).

Differential Diagnosis. This new species is similar to *C.* (*s. str.*) *flavicaudis* Tan [37] and both of their basal margin of pronotum with the same semi-circular notches, but it can be distinguished from the latter by the small-sized body, the underside almost entirely ochraceous and the apex of aedeagus wider than middle part, while the latter with large body, the underside with black band and the aedeagus slender with lateral margins almost parallel.

Etymology. The specific epithet is derived from the Latin words "*incisus*" and "*dentatus*" to indicate the basal margin of pronotum with a pair of deeply semi-circular notches.

3.4.4. *Cryptocephalus (Cryptocephalus) nigroflavusiventerus* Duan, Wang and Zhou, sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:089037BA-FB52-4D8A-A2FF-27293ADB54A7

Figures 7–9.

Type locality. China: Yunnan Province: Xishuangbanna, Xiaomengyang.

Type material examined. Holotype: male, CHINA: Yunnan Province: Xishuangbanna, Xiaomengyang, 14. VI. 1957, coll. Lingchao Zang (IZ-CAS). Paratypes: 1 male, same data as holotype (IZ-CAS); Yunnan Province: 1 male, 1 female, Xishuangbanna, Xiaomengyang, 13. VI. 1957, coll. Shuyong Wang (IZ-CAS); 1 male, Xishuangbanna, Xiaomengyang, 20. VI. 1957, coll. Shuyong Wang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 25. VI.

1957, coll. Shuyong Wang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 9. VII. 1957, coll. Lingchao Zang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 11. VII. 1957, coll. Lingchao Zang (IZ-CAS); 1 male, Xishuangbanna, Xiaomengyang, 7. IX. 1958, coll. Xuwu Meng (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 13. IX. 1958, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna Botanical Garden, 18. VII. 2007, coll. Guo Zheng (IZ-CAS).

Measurements. BL = 4.41–4.99 mm, BW = 2.58–2.94 mm, HL = 1.41 mm, HW = 1.39 mm, PL = 1.57 mm, PW = 2.70 mm, EL = 3.30 mm, AL = 1.53 mm, AW = 0.45 mm, SL = 0.58 mm.

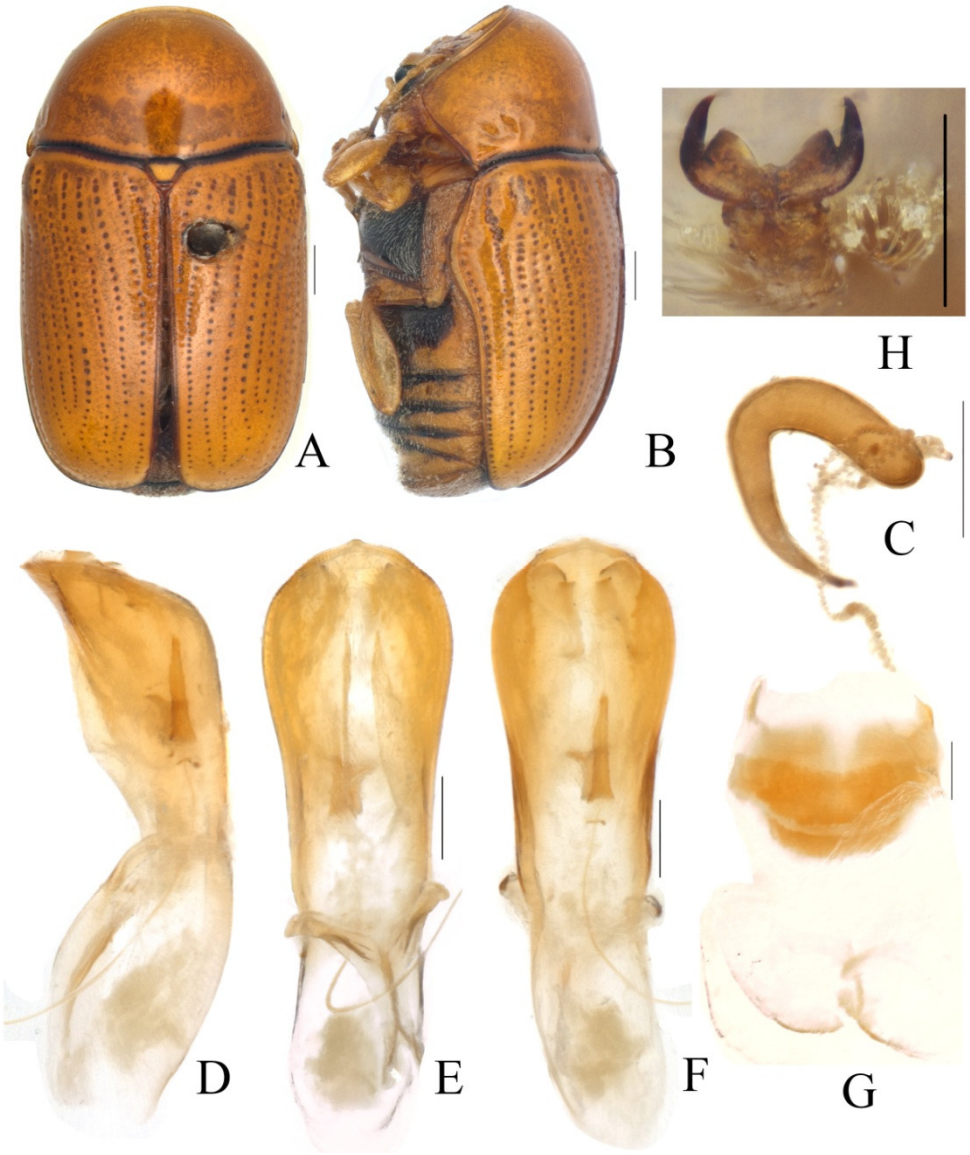

Figure 7. *Cryptocephalus* (*Cryptocephalus*) *nigroflavusiventerus* Duan, Wang and Zhou, sp. nov.: (**A**). habitus; (**B**). lateral view of habitus; (**C**). spermatheca; (**D**). lateral view of aedeagus; (**E**). ventral view of aedeagus; (**F**). dorsal view of aedeagus; (**G**). rectal pad. H. claw (Scale bars: **A**–**B** = 0.5 mm, **C**–**H** = 0.2 mm).

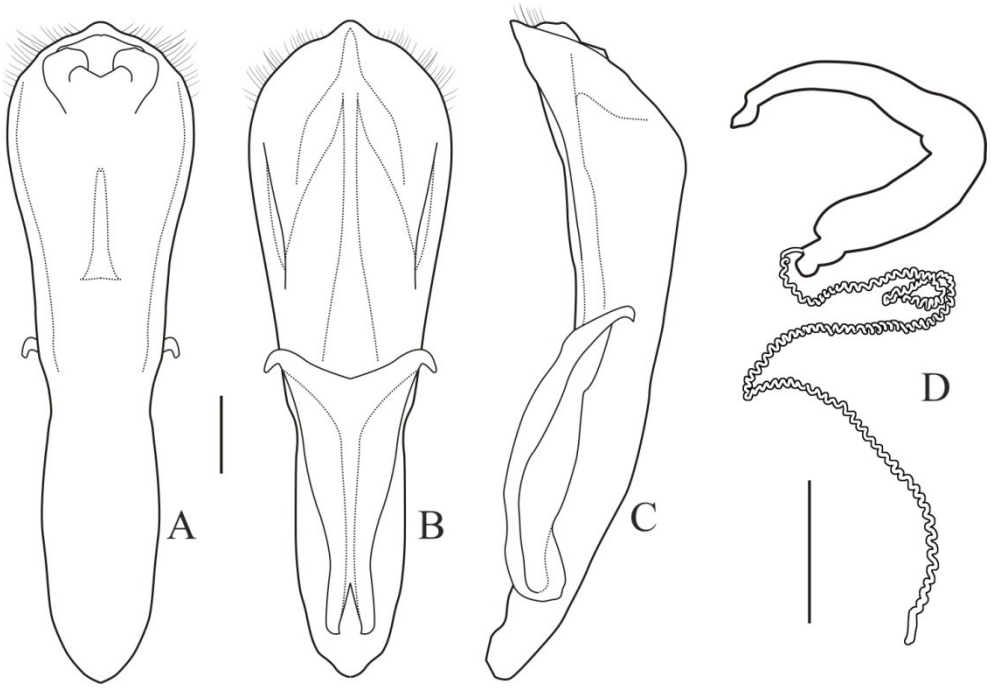

Figure 8. *Cryptocephalus* (*Cryptocephalus*) *nigroflavusiventerus* Duan, Wang and Zhou, sp. nov.: (**A**). dorsal view of aedeagus; (**B**). ventral view of aedeagus; (**C**). lateral view of aedeagus; (**D**). spermatheca. (Scale bars: **A**–**D** = 0.2 mm).

Figure 9. Distribution map of *Cryptocephalus* (*Cryptocephalus*) *biordopunctatus* Duan, Wang and Zhou, sp. nov. (red);. *Cryptocephalus* (*C.*) *hani* Duan, Wang and Zhou, sp. nov. (yellow); *Cryptocephalus* (*C.*) *incisodentatus* Duan, Wang and Zhou, sp. nov. (green); *Cryptocephalus* (*C.*) *nigroflavusiventerus* Duan, Wang and Zhou, sp. nov. (blue). (Map download from: http://bzdt.ch.mnr.gov.cn on 8 September 2021).

Description. Body (Figure 7A,B) ochraceous. Head ochraceous, labrum, and labial palpus yellow; basal margin of clypeus reddish brown; mandibles black; antennae yellowish brown on first four segments, darkish brown on last seven. Pronotum with black basal margin. Scutellum yellow, anterior and posterior margins black, anterior region tinted with reddish brown; lateral margin brown. Elytron with reddish brown margins. Ventral surface of body largely darkly yellowish brown; lateral region of metasternum black; abdomen yellowish brown, and basal part of each segment black, legs yellowish brown, claws black.

Head more than one-half as broad as prothorax, nearly round in frontal outline, surface smooth. Eyes emarginated below middle, superior eye-lobes separated slightly wider than antennal insertions. Clypeus impunctate, apical region wrinkled, anterior margin slightly concave. Antennae of male long and broad, reaching apical 1/4 of elytra; 1st segment thick, clubbed, 2nd spherical, 2/5 as long as 1st; 3rd–4th slender, about equal in length, shorter than 5th, from 5th segment on somewhat equal in length, 5th–8th broadened and flatted, and last 3 segments long and thin.

Pronotum (Figure 7A,B) strongly convex, smooth, and shining, nearly 0.58 time as long as broad, trapezoidal from dorsal view; anterior margin slightly arcuate in anterodorsal view; basal margin weakly sinuate, obtuse and truncate on middle; disc evenly convex, smooth, impunctate. Scutellum trapezoidal, wider than length, basal margin truncate, sloping upward apically, smooth and impunctate.

Elytron (Figure 7A,B) about 2.4 times as long as broad, humeri weakly prominent, glabrous, rounded-truncate apically. Disc of each with eleven somewhat oblique rows of fairly deep punctures; interspaces with densely fine punctures.

Ventral surfaces of body with rather densely fine punctures and shortly silver pubescence. Prosternum square, surface uneven, center of anterior margin slightly protruding, posterior margin with a pair of lobes. Mesosternum broad and small, square. The middle part of metasternum glabrous, with densely fine punctures, lateral region with densely pubescence. Pygidium with densely fine punctures and short pubescence. Claws with teeth (Figure 7H).

Aedeagus (Figure 7D–F and Figure 8A–C) elongate, clubbed, about 3.4 times as long as wide. Apex of median lobe arcuate, slightly narrower than middle, round at apex, weakly curved in lateral view; with several pubescence on each side of apex, impunctate. Median orifice with median sclerite bending inwards below surface. Inner sac rather slender. Tegmen Y-shaped, moderately sclerotized.

Female. Body more robust than male; antennae slightly shorter than male, coloration of ventral side of body darker than male, metasternum entirely black, central part of abdomen black, posterior margin of pygidium more broadened and rounded. Spermatheca (Figures 7C and 8D) hook-shaped, acute-angled bending nearly 1/2 from apex, very acute at apex; duct weakly sclerotized, spirally coiling. Rectal sclerites (Figure 7G) weakly sclerotized, connected between two rectangular sclerites on ventral side.

Distribution. China (Yunnan) (Figure 9).

Differential Diagnosis. This new species is similar to *C.* (*s. str.*) *gestroi* Jacoby [32], but can be distinguished by the basal margin of each abdominal segment black and the other part yellow, with the median parts darker than the lateral.

Etymology. The specific epithet is derived from the Latin words "*nigro-, flavus*" and "*venter*"; it means that this new species has the abdominal coloration of yellow and black in an alternately arranged pattern.

3.5. Three New Record Species to China

3.5.1. Cryptocephalus (Cryptocephalus) lacosus Pic, 1922

Figures 10 and 11.

Pic, 1922: 9 (type locality: Tonkin; type deposited: MNHN); Kimoto and Gressitt, 1981: 348 (Laos) [7,30].

Syn.: *Cryptocephalus innotaticollis* Pic, 1929: 139 (type locality: Tonkin; type deposited: MNHN); Kimoto and Gressitt, 1981: 348 (as synonym of *Cryptocephalus lacosus*) [7,40].

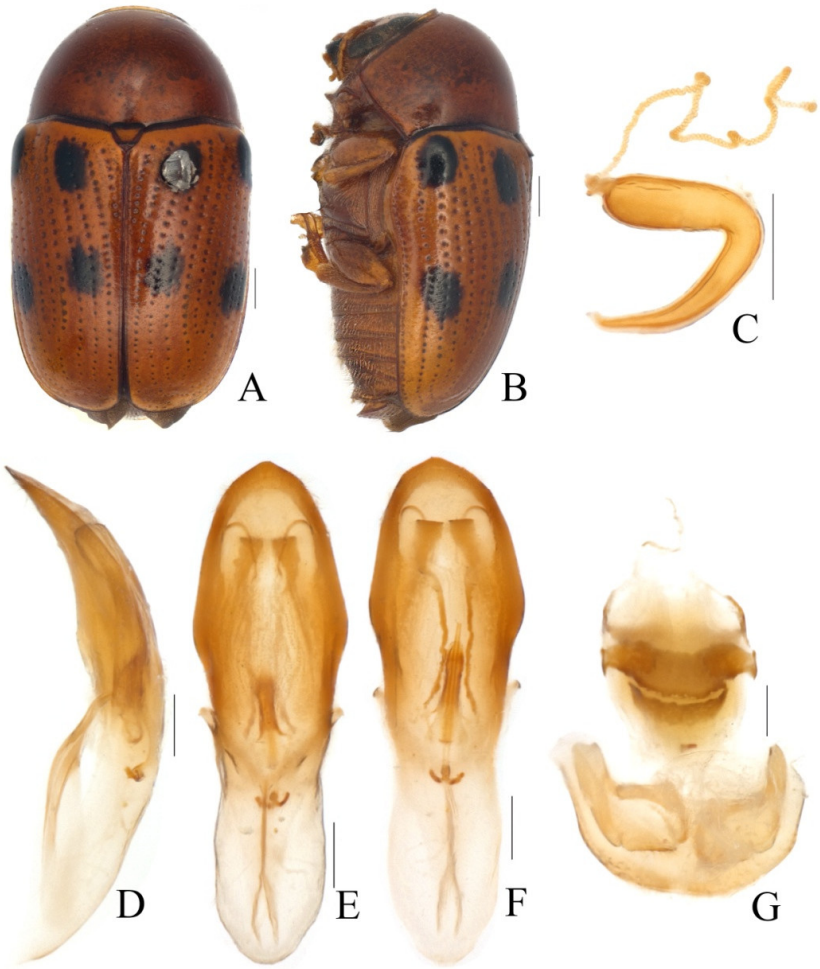

Figure 10. *Cryptocephalus* (*Cryptocephalus*) *lacosus* Pic, 1922: (**A**). habitus; (**B**). lateral view of habitus; (**C**). spermatheca; (**D**). lateral view of aedeagus; (**E**). ventral view of aedeagus; (**F**). dorsal view of aedeagus; (**G**). rectal pad. (Scale bars: **A**,**B** = 0.5 mm, **C**–**G** = 0.2 mm).

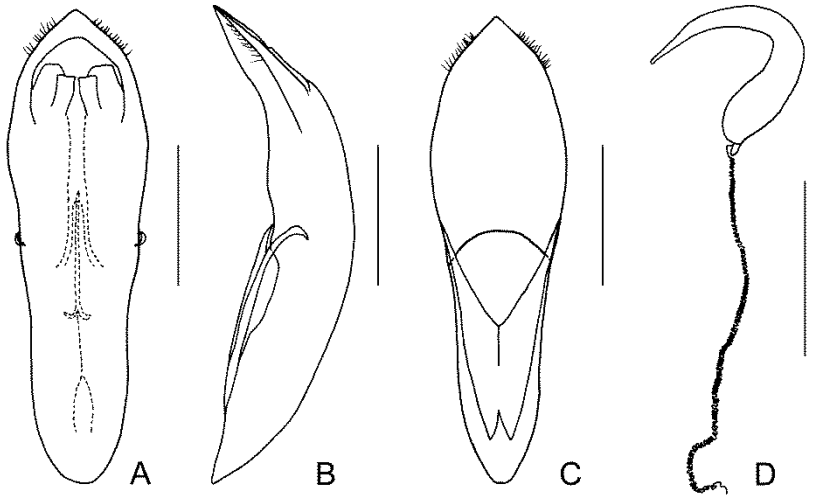

Figure 11. *Cryptocephalus* (*Cryptocephalus*) *lacosus* Pic, 1922: (**A**). dorsal view of aedeagus; (**B**). lateral view of aedeagus; (**C**). ventral view of aedeagus; (**D**). spermatheca. (Scale bars: **A**–**D** = 0.5 mm).

Material examined. CHINA: Yunnan province: Xishuangbanna, Xiaomengyang, 21. VI. 1957, coll. Shuyong Wang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 23. VI, 1957, coll. Lingchao Zang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 6. VII. 1957,

coll. Shuyong Wang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 22. VIII. 1958, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna, Yunjinghong, 28. IV. 1958, coll. Xuezhong Zhang (IZ-CAS); 1 female, Xishuangbanna, Yunjinghong, 8. VIII. 1958, coll. Xuwu Meng (IZ-CAS); 1 female, Xishuangbanna, Mengla, 24. V. 1959, coll. Yiran Zhang (IZ-CAS); 1 male, Xishuangbanna, Mengla, 29. V. 1959, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna, Mengla, 29. V. 1959, coll. Fuji Pu (IZ-CAS); 1 female, Xishuangbanna, Mengla, 29. V. 1959, coll. Facai Zhang (IZ-CAS); 1 female, Xishuangbanna, Mengla, 6. VI. 1959, coll. Fuji Pu (IZ-CAS); 1 female, Xishuangbanna, 26. VII. 1959, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna, Menglun, 30. VII. 1959, coll. Yiran Zhang (IZ-CAS).

Measurements. BL = 3.38–3.82 mm, BW = 2.01–2.29 mm, HL = 1.45 mm, HW = 1.57 mm, PL = 1.13 mm, PW = 1.92 mm, EL = 2.62 mm, AL = 1.49 mm, AW = 0.47 mm, SL = 0.65 mm.

Distribution. China (Yunnan); Laos; Vietnam.

3.5.2. *Cryptocephalus (Cryptocephalus) nigriceps* Allard, 1891

Figures 12 and 13.

Allard, 1891: 232 (type locality: Laos); Clavareau, 1913: 166; Kimoto and Gressitt, 1981: 351 [1,7,12].

Syn.: *Cryptocephalus feae* Jacoby, 1892: 891 (type locality: Carin Cheba); 1908: 206; Medvedev, 2002: 252 (as synonymy of *Cryptocephalus nigriceps*) [13,32,41].

Cryptocephalus foveoatoscutus Pic 1920a: 28; Kimoto and Gressitt, 1981: 351 (as synonym of *Cryptocephalus nigriceps*) [7,42].

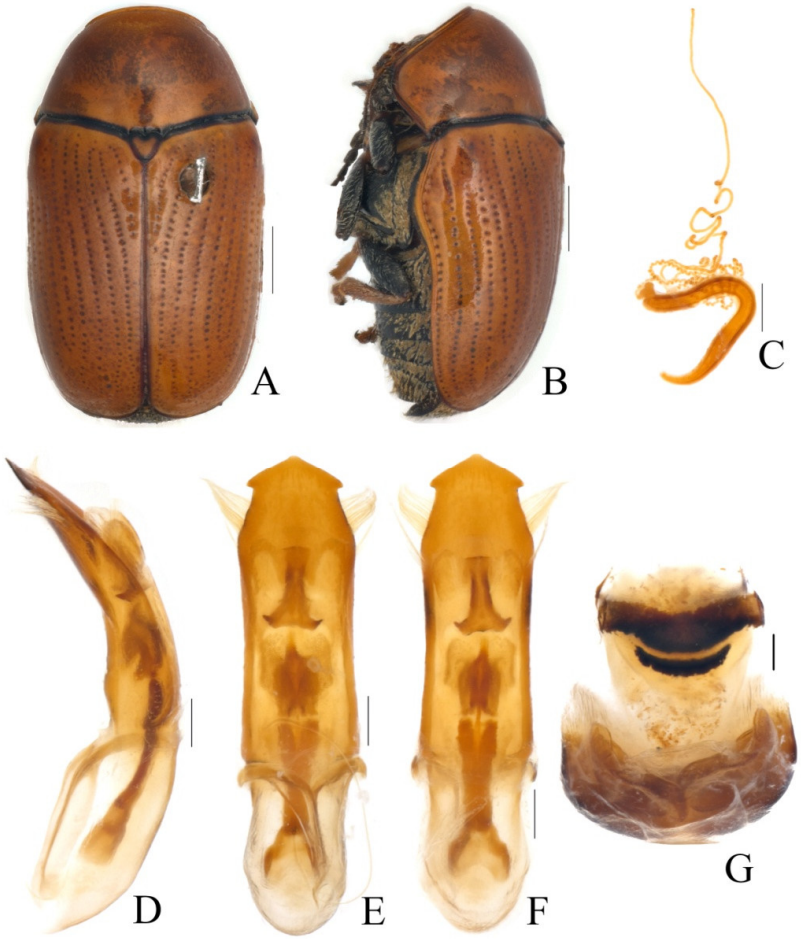

Figure 12. *Cryptocephalus* (*Cryptocephalus*) *nigriceps* Allard, 1891: (**A**). habitus; (**B**). lateral view of habitus; (**C**). spermatheca; (**D**). lateral view of aedeagus; (**E**). ventral view of aedeagus; (**F**). dorsal view of aedeagus; (**G**). rectal pad. (Scale bars: **A**,**B** = 0.5 mm, **C**–**G** = 0.2 mm).

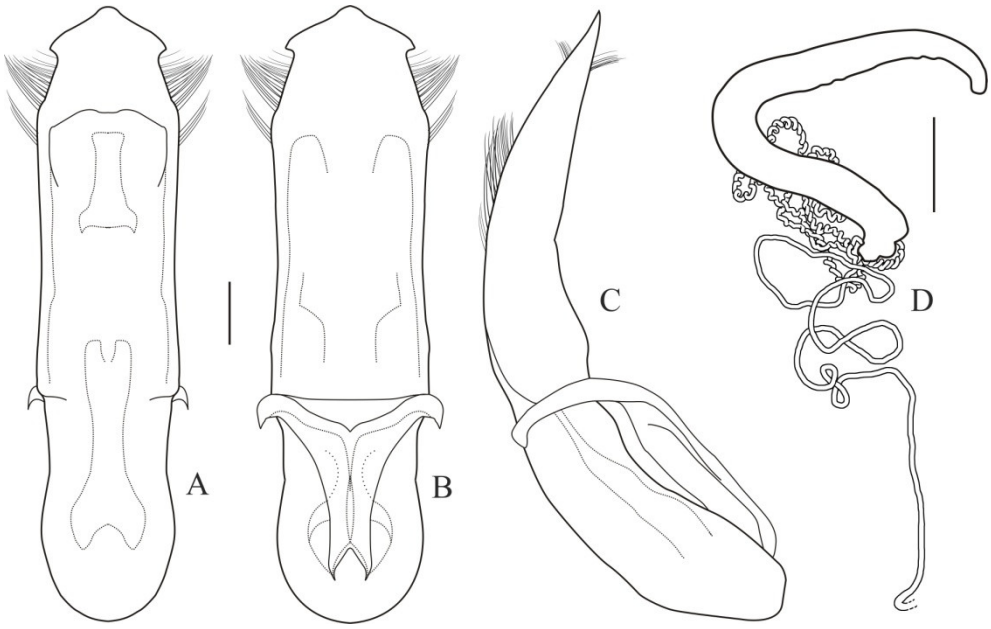

Figure 13. *Cryptocephalus* (*Cryptocephalus*) *nigriceps* Allard, 1891: (**A**). dorsal view of aedeagus; (**B**). ventral view of aedeagus; (**C**). lateral view of aedeagus; (**D**). spermatheca. (Scale bars: **A**–**D** = 0.2 mm).

Material examined. CHINA: Yunnan province: 1 male, Xishuangbanna, Xiaomengyang, 7. IX. 1957, coll. Lingchao Zang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 12. IX. 1957, coll. Shuyong Wang (IZ-CAS); 2 females, Xishuangbanna, Xiaomengyang, 24. VIII. 1958, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 1. IX. 1958, coll. Leyi Zheng (IZ-CAS); 1 male, Xishuangbanna, Xiaomengyang, 2. IX. 1958, coll. Xuwu Meng (IZ-CAS); 1 male, Xishuangbanna, Xiaomengyang, 6. IX. 1958, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna, Xiaomengyang, 7. IX. 1958, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna, Mengla, 15. XI. 1958, coll. Fuji Pu (IZ-CAS); 1 female, Xishuangbanna, Mengla, 15. XI. 1958, coll. Yiran Zhang (IZ-CAS); 1 female, Xishuangbanna, Mountain Kongming, 19. IX. 1957, coll. Shuyong Wang (IZ-CAS); 2 females, Xishuangbanna, Moutain Kongming, 25. IX. 1957, coll. Lingchao Zang (IZ-CAS); 1 female, Yiwubanna, Menglun, 25. X. 1958, coll. Yiran Zhang (IZ-CAS); 1 male, Yiwubanna, Menglun, 26. X. 1958, coll. Shuyong Wang (IZ-CAS); 1 female, Menglun, 17. IX. 1983, coll. Wenzhen Ma (IZ-CAS).

Measurements. BL = 5.60–6.33 mm, BW = 3.20–3.65 mm, HL = 1.63 mm, HW = 1.76 mm, PL = 1.87 mm, PW = 3.35 mm, EL = 4.39 mm, AL = 1.89 mm, AW = 0.46 mm, SL = 0.95 mm.

Distribution. China (Yunnan); Laos.

3.5.3. *Cryptocephalus (Cryptocephalus) rajah* Jacoby, 1908

Figure 14.

Jacoby, 1908: 256 (type locality: Ostindien); Clavareau, 1913: 179 (catalogue) [1,13].

Material examined. CHINA: Yunnan province: 1 female, Xishuangbanna, Yunjinghong, 1. VII. 1958, coll. Xuwu Meng (IZ-CAS).

Measurements. BL = 4.66 mm, BW = 2.76 mm, HL = 1.65 mm, HW = 1.62 mm, PL = 1.52 mm, PW = 2.48 mm, EL = 3.21 mm.

Distribution. China (Yunnan); Ostindien (Bombay).

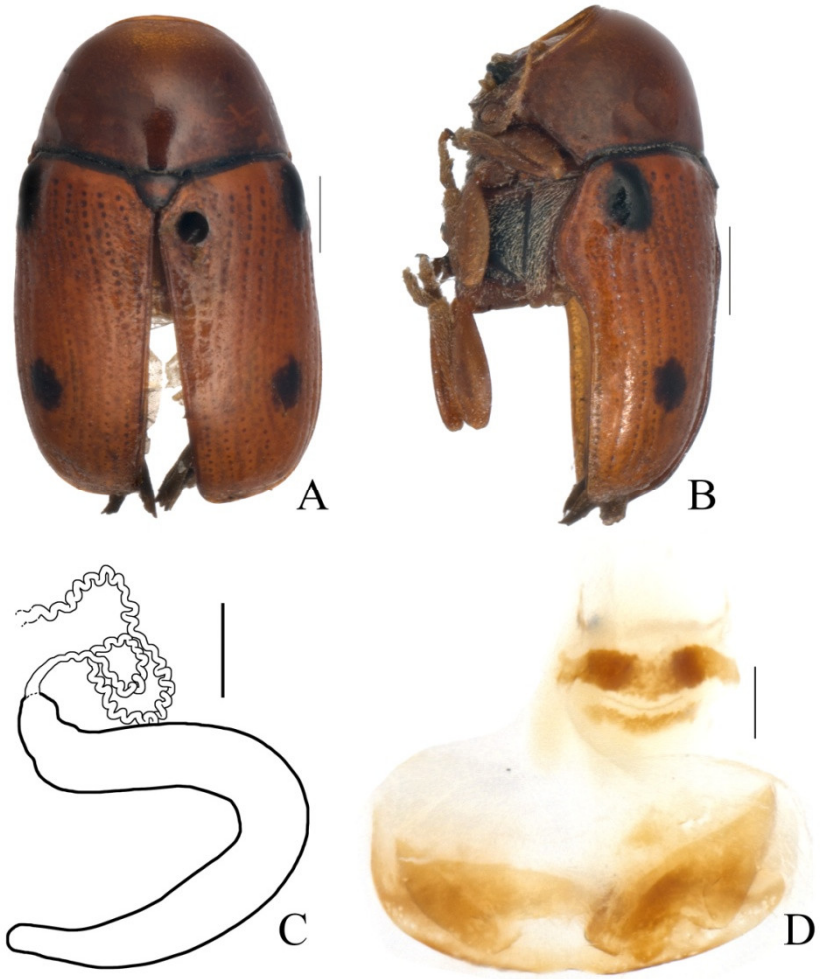

Figure 14. *Cryptocephalus* (*Cryptocephalus*) *rajah* Jacoby, 1908: (**A**). habitus; (**B**). lateral view of habitus; (**C**). spermatheca; (**D**). rectal pad. (Scale bars: **A**,**B** = 1.0 mm; **C**,**D** = 0.2 mm).

3.6. Species Transferred from the Subgenus Burlinius

Cryptocephalus (Cryptocephalus) nigrolimbatus Jacoby, 1890 (stat. nov.)

Figures 15 and 16.

Jacoby, 1890: 87, t. 1, f. 6 (type locality: Changyang; type deposited: BMNH); Clavareau, 1913: 166 (catalogue); Chen, 1942: 121; Gressitt and Kimoto, 1961: 158 (catalogue); Lopatin et al., 2010: 587 (catalogue) [1,2,5–7,14].

Material examined. CHINA: Hubei province: 1 female, Heling, 31. VII. 1989, coll. Longlong Yang (IZ-CAS); Sichuan Province, 2 females, Luding, Xinxing, 12. VI. 1983, coll. Yuanqing Chen (IZ-CAS); 1 female, Kangding, 22. VI. 1983, coll. Shuyong Wang (IZ-CAS); Yunnan province: 1 female, Weixi, Pantiange, 24. VII. 1981, coll. Xuezhong Zhang (IZ-CAS); Weixi, Pantiange, 25. VII. 1963, coll. Shuyong Wang (IZ-CAS); Gansu province: Maijishan, 3. VI. 1964, coll. Yao Zhou and Shaoyou Liu (IZ-CAS).

Measurements. BL = 3.77–4.26 mm, BW = 2.30–2.53 mm, HL = 1.13 mm, HW = 1.18 mm, PL = 1.20 mm, PW = 2.17 mm, EL = 3.10 mm, AL = 1.25 mm, AW = 0.38 mm, SL = 0.40 mm.

Distribution. China (Hubei, Sichuan, Yunnan, Gansu).

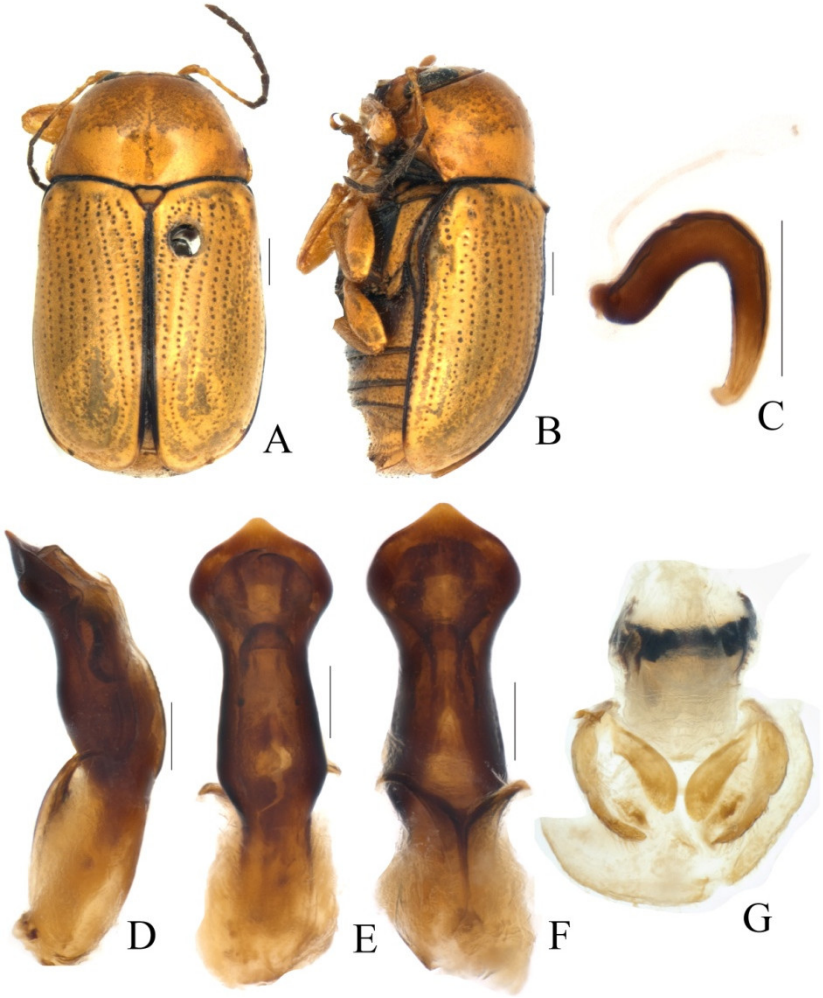

Figure 15. *Cryptocephalus* (*Cryptocephalus*) *nigrolimbatus* Jacoby, 1890: (**A**). habitus; (**B**). lateral view of habitus; (**C**). spermatheca; (**D**). lateral view of aedeagus; (**E**). dorsal view of aedeagus; (**F**). ventral view of aedeagus; G. rectal pad. (Scale bars: **A**,**B** = 0.5 mm, **C**–**G** = 0.2 mm).

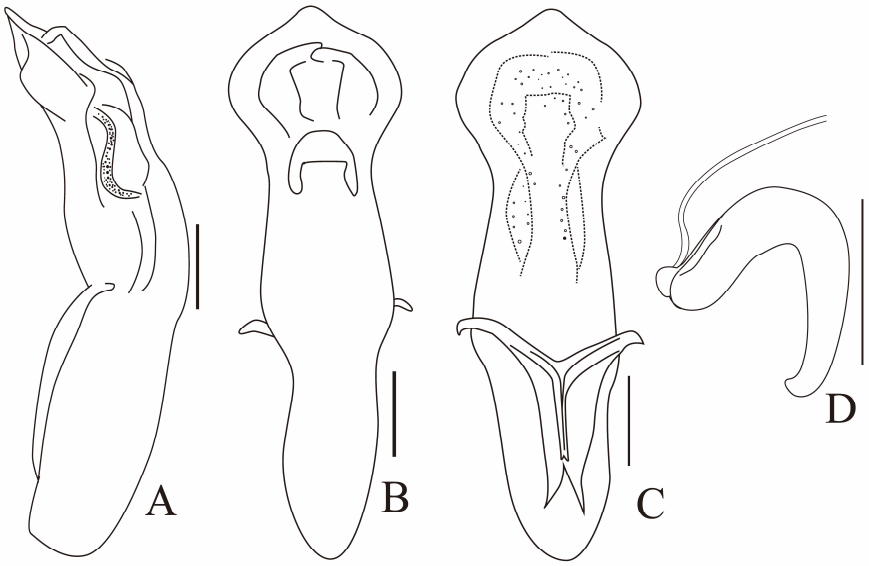

Figure 16. *Cryptocephalus* (*Cryptocephalus*) *nigrolimbatus* Jacoby, 1890: (**A**). lateral view of aedeagus; (**B**). dorsal view of aedeagus; (**C**). ventral view of aedeagus; (**D**). spermatheca. (Scale bars: **A**–**D** = 0.2 mm).

Remark. This species has variation in color, with some being bright yellow and others yellowish brown. The abdominal underside of some specimen tinged with black whereas other not.

After checking the materials in IZ-CAS under the name of *C. nigrolimbatus* Jacoby, 1890 [14], we found the species should be moved from the subgenus *Burlinius* to this subgenus and designed to this specie group, mainly based on the following characters: length of body (Figure 15A,B) 3.8–4.6 mm; eyes and head large; aedeagus (Figures 15D–F and 16A–C) simple, apically not prolonged into three or two processes.

4. Discussion

This study reports our taxonomic finding, with our attention concentrated on the *Cryptocephalus heraldicus* species group. The paper includes four new species, three species recorded for the first time in China, and other important changes in grouping some species in subgenus level. These results are of course the new contributions to the Chinese fauna of this megadiverse leaf beetle genus *Cryptocephalus* Geoffroy and definitely promotes the advances in the investigations on systematics, phylogeny, and zoogeography of the large subfamily Cryptocephalinae in the future.

As we pointed out in the Introduction part, the genus *Cryptocephalus* Geoffroy is megadiverse, with a wide geographical distribution in almost all zoogeographical regions of the world [1–4], and very difficult to get a taxonomic revising study including the whole genus of ca. 1800 species. As a matter of fact, no taxonomic study has been done in the past few decades [3], except for some that concentrated merely on local faunas [2,4–8,43,44]. These publications are of course excellent contributions to this group. Our study contributed a new version of the species-group classification of the Chinese species and provided a new key to all the species groups found in China. In this point of view, this study is also a taxonomic review with its particular emphasis located upon the fauna of China, a country with very large territory and high biodiversity in the world and of great importance to fill the gap in word species inventories.

This study is concentrated on the leaf beetle subgenus *Cryptocephalus* Geoffroy from China and is the only contribution concerning this large genus in the last three decades after Tan (1992) [37]. Our results increase the species number of *Cryptocephalus heraldicus* species group to 30 in total. This new taxonomic finding may be of biological and systematic significance in filling gaps in the faunistic composition of the genus *Cryptocephalus* Geoffroy in China. This study is also one of our series studies on the leaf beetle subfamily Cryptocephalinae (including Cryptocephalini and Clytrini) [45–49].

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