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TWO NEW SPECIES OF *LUCANUS* SCOPOLI, 1763 (COLEOPTERA: LUCANIDAE, LUCANINAE) FROM YUNNAN, SOUTHWEST CHINA

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Summary. The stag beetle genus *Lucanus* Scopoli, 1763 (Coleoptera: Lucanidae, Lucaninae, Lucanini) consists of 118 species (without subspecies), of which 64 species known from China. Two new species, *Lucanus niu* **sp. n.** and *Lucanus zenghuae* **sp. n.**, are described from Yunnan Province, Southwest China. Diagnostic characters of the two new species are illustrated and compared with closely related congeners.

Key words: stag beetle, Lucanini, taxonomy, new species, Oriental region.

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Резюме. Род жуков-оленей *Lucanus* Scopoli, 1763 (Coleoptera: Lucanidae, Lucaninae, Lucanini) насчитывает 118 видов (без подвидов), из них 64 вида известны из Китая. Из китайской провинции Юньнань описываются два новых для науки вида: *Lucanus niu* **sp. n.** и *Lucanus zenghuae* **sp. n.** Диагностические признаки обоих видов проиллюстрированы и сравнены с близкими видами.

INTRODUCTION

Lucanus Scopoli, 1763 is the type genus of the family Lucanidae (Coleoptera) with members occurring in the Nearctic, Oriental and Palearctic regions; however, it reaches its highest diversity in eastern Asia. Since the three milestone books of "Stag beetles of China" by Huang & Chen (2010, 2013, 2017a), nine species have been contributed to *Lucanus* from Chinese fauna: *L. zhanbishengi* Wang et Zhu, 2017 from Hunan (Wang & Zhu, 2017), *L. zhuxiangi* Wang et Zhan, 2018 from Guangdong and Hunan (Wang & Zhan, 2018), *L. chengyuani* Wang et Ko, 2018 from Taiwan (Wang & Ko, 2018), *L. liuweii* Huang et Chen,

2019 from Zhejiang (Huang & Chen, 2019), *L. cenwanglaoshanus* Huang et Chen, 2020 from Guangxi (Huang & Chen, 2020), *L. takeoi* Adachi, 2020 from Sichuan (Adachi, 2020), *L. yulaoensis* Lin, 2021 from Taiwan (Lin, 2021), *L. moae* Qi, 2021 from Sichuan (Qi, 2021), and *L. shulini* Bian et Zhan, 2021 from Xizang (Bian & Zhan, 2021). In the present paper, we describe and illustrate two new species of *Lucanus* both from Yunnan Province, Southwest China, under the name of *L. niu* **sp. n.** and *L. zenghuae* **sp. n.** Therefore, the number of the *Lucanus* species from China comes to 66 (without subspecies) (Huang & Chen, 2010, 2013; Bartolozzi *et al*., 2016, Huang & Chen, 2017b, unpublished data of the authors). *L. niu* **sp. n.** is closely related to *L. vitalisi* Pouillaude, 1913, and *L. zenghuae* **sp. n.** is most similar to *L. pesarinii* Zilioli, 1998 and *L. derani fukinukiae* Katsura et Giang, 2002. Important morphological characters of the two new species are illustrated and their differential diagnoses from related congeners are provided.

MATERIAL AND METHODS

Specimens were relaxed and softened in a digital homeothermic water bath HH-2 at 44.4 – for 12 hours and then placed in distilled water for cleaning, observation and dissection. To examine the genitalia, the abdomens were detached and treated with a 10% potassium hydroxide solution for 12 hours. They were then placed in distilled water to remove the remaining KOH and prevent any further bleaching. After examination, the body parts were mounted on a slide using Euparal Mounting Medium for future studies. Habitus images were taken using a Canon 50D DSLR with a Canon EF 100mm f/2.8L IS USM lens, and a Canon MT-24EX Macro Twin Lite Flash was used as light source. Images of the morphological details were taken with a Canon macro photo lens MP-E 65mm on a Canon 5DsR. Images of the same object at different focal planes were combined using Zerene Stacker 1.04 stacking software. Adobe Photoshop CS6 was used for post-processing. Morphological terminology follows Holloway (2007), Huang & Chen (2010), Huang & Chen (2013) and Huang & Chen (2017).

The material examined for this study is deposited in the following institutional and private collections: CCZC – collection of Chao Zhou, Chengdu, China; CTLH – collection of Tian-Long He, Huainan, China; CYCX – collection of Yun-Chuan Xu, Yuxi, China; MAHU – Museum of Anhui University, Hefei, China; MYNU – the invertebrate collection of Mianyang Normal University, Mianyang, China.

The following material was studied for comparison: ***Lucanus vitalisi*** Pouillaude, 1913 (*vs*. *Lucanus niu* **sp. n.**): CHINA, Yunnan: Honghe Prefecture, Luchun County, Huanglianshan [红河州绿春县黄连山], VI.2019, 3♂, 1800 m, Tian-Long He leg. (CTLH); the same data as previous except: VI.2020, 4♂; VIETNAM: Yen Bai, Mu Cang Chai, 1700 m, V.2017, 1♂, local people leg. (CTLH); the same data except: V.2019, 4♂; the same data except: IV.2020, 3♂; ***Lucanus pesarinii*** Zilioli, 1998 (*vs*. *Lucanus zenghuae* **sp. n.**): VIETNAM: Vinh Phuc, Tam Dao, VII.2004, 1♂, local people leg. (CTLH); the same data except: VI.2021, 1♂; ***Lucanus derani fukinukiae*** Katsura et Giang, 2002 (*vs*. *Lucanus zenghuae* **sp. n.**): CHINA, Yunnan: Honghe Prefecture, Pingbian County, Daweishan [红河州屏边县大围山], V.2015, 10♂, Tian-Long He leg. (CTLH); the same data except: V.2016, 9♂; the same data except: V.2019, 12♂; the same data except: V.2020, 10♂; the same data except: V.2021, 7♂, Tian-Long He & Hao Xu leg.; CHINA, Yunnan: Honghe Prefecture, Jinping County, Fenshuiling [红河州金平县分水岭], VI.2016, 3♂, Tian-Long He leg. (CTLH); the same data except: VI.2019, 2♂; the same data as previous except: VI.2020, 2♂; VIETNAM: Lai Chau, Phong Tho, V.2019, 2♂, local people leg. (CTLH); the same data except: V.2020, 4♂.

Measurement criteria in millimetres (mm) are as follows: body length – length between the apex of mandible and the elytral apex along the midline; elytral length – length between the

basal border and the apex of elytra along suture; elytral width – widest part of both elytra combined; head length – length between the anterior apex of clypeus and the posterior margin of occiput along the midline; head width – widest part of head; mandible length – length from the apex of mandible to its base; pronotal length – length of the pronotum along the midline; pronotal width – widest part of pronotum.

DESCRIPTIONS OF NEW SPECIES

Lucanus niu **Wang, He, He et Zhou, sp. n.**

https://zoobank.org/NomenclaturalActs/EE5B2E96-8327-48CC-A51E-476209B24E2B

Figs 1, 2

MATERIAL EXAMINED. Holotype – ♂, **China**: Yunnan, Puer City, Zhenyuan County [普洱市镇沅县], 12.VI 2020, 2000 m, Shao-You Huang leg. (MAHU). Paratypes (totally 10 ♂): the same data as holotype, 1♂ (CCZC) and 3♂ (CTLH); the same data as holotype except: 24.VI 2020, 1♂ (CTLH) and 1♂ (CYCX), Yun-Chuan Xu leg.; the same data as holotype except: 2000 m, 5.VI 2021, 3♂ (CTLH) and 1♂ (MYNU), local people leg.

DESCRIPTION. HOLOTYPE MALE. Large size, body 57.4 mm long. Lengths of body parts (mm): head (9.3), mandible (21.2), pronotum (8.3), elytra (23.0); width (mm): head (14.8), pronotum (13.6), elytra (16.6).

Habitus (Fig. 1a–c). Color mostly reddish brown to blackish brown; elytra reddish brown; femora with reddish stripes on ventral surfaces; tibiae with obscure reddish stripes on ventral surfaces; protibiae tinged with reddish on dorsal surfaces. Body mostly clothed with short, sparse, recumbent, yellowish pubescence, similar on metaventrite, much finer and denser on elytra.

Head 1.6 times as wide as long, widest at anterolateral angles; surfaces matt, finely punctate, intervals finely and irregularly granulose. Frons relatively long, fan-like, weakly concave, fused with clypeolabrum. Clypeal ridge strong, medially interrupted, laterally projecting as two ridges. Labrum slenderly subtriangular, rounded at apex. Anterolateral angles acute, strongly protruding laterally, more prominent than eyes. Ocular canthus protruding, shorter than half eye's diameter. Postocular margin almost oblique, gradually narrowed posteriorly. Posterior margin widely concave. Anterior ridge distinctly and oblongly elevated, substraight at apical margin. Lateral ridges rather strongly elevated, broad, widely subrounded at apical margins. Mandible long and slender, about 2.3 times as long as head; in dorsal view, mandible curved in basal 1/4 and apical 1/5, and almost straight in between; in lateral view, mandible strongly curved in basal 3/5 and almost straight in apical 2/5; surfaces finely punctate, intervals matt and finely granulose at inner side, feebly sheen and microreticulate at outer side. Inner mandibular margin with unarmed carina at base, preceded by diastema, 7–8 small denticles, major inner tooth, and 2–3 distal small denticles. Major inner tooth situated at apical 1/3, strong, digitiform, shorter than mandibular width, tilting forwards and upwards with apex rounded and slightly higher than mandible. Apical fork with upper tooth bent upwards and inwards; lower tooth markedly shorter, conical, slightly directed downwards and inwards. Antennal club 4-segmented; antennomere VII with much thinner lamella, sharply pointing inwards, only pubescent on apical surface; antennomeres VIII–X with strong, long, pubescent lamellae. Mentum wide, inverted trapezoidal; anterior margin almost straight and with obliquely truncated corners; surface matt, finely punctate, intervals finely and irregularly granulose, and transversely depressed near anterior margin.

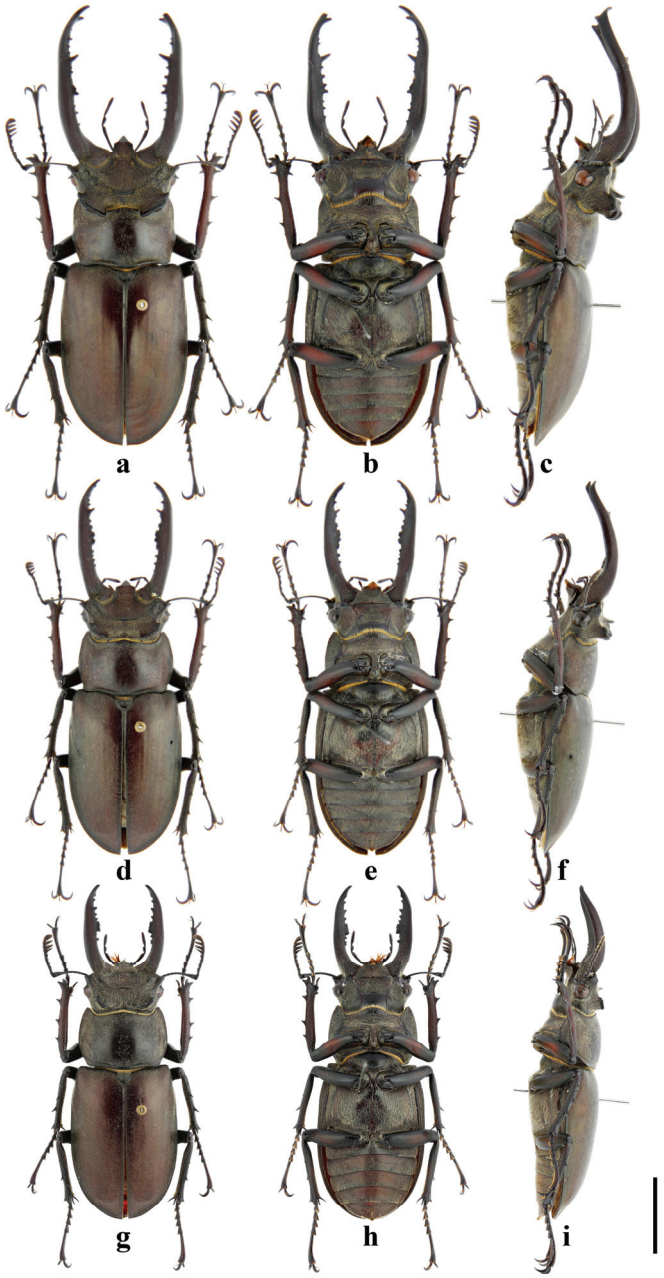

Fig. 1. *Lucanus niu* sp. n., male habitus. a–c – large size, holotype; d–f – moderate size, paratype; g–i – small size, paratype; (a, d, g – dorsal view; b, e, h – ventral view; c, f, i – lateral view). Scale bar = 1.0 cm.

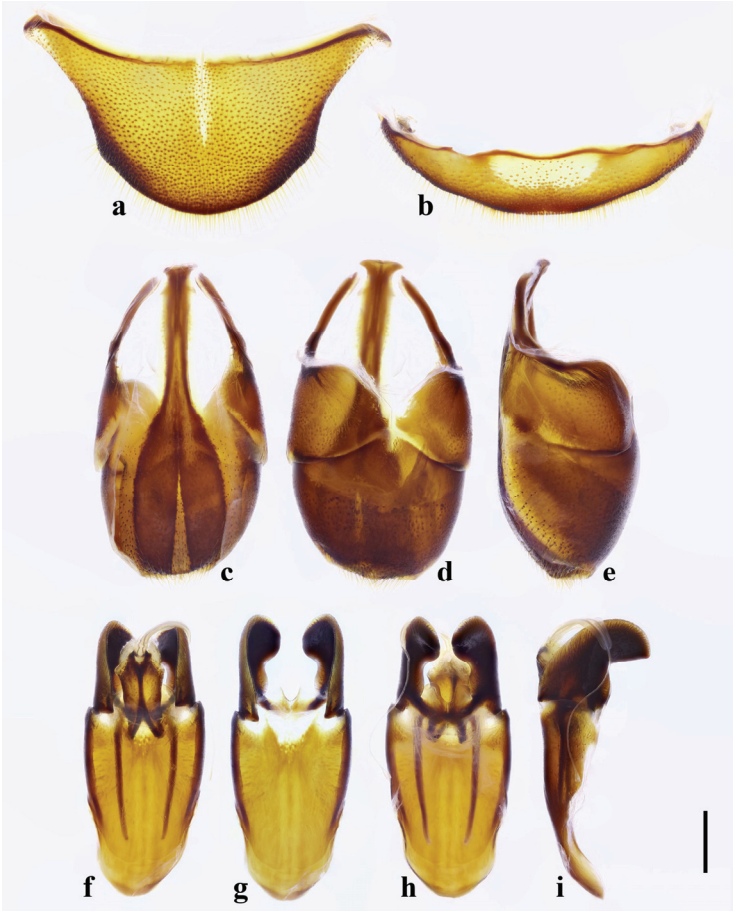

Fig. 2. *Lucanus niu* sp. n., male genitalia of holotype. a – abdominal tergite VIII; b – abdominal sternite VIII; c–e – abdominal segment IX; f–i – aedeagus (penis removed in g); (a, d, h: – dorsal view; b, c, f, g: – ventral view; e, i: l– ateral view). Scale bar = 1.0 mm.

Pronotum 1.6 times as wide as long, widest at middle. Anterior corners weakly acute; posterior corners obtuse. Surface feebly sheen, finely punctate, intervals finely and irregularly granulose, and with median longitudinal depression rather shallow. Prosternal apophysis strong, distinctly convex ventrally in middle of posterior part, and truncated at posterior margin.

Scutellum linguiform, about 1.8 times as wide as long, rounded at apical margin. Surface feebly sheen, finely punctate, intervals microreticulate.

Elytra oval, 1.4 times as long as wide, widest around basal 4/9, 2.8 times as long as and 1.2 times as wide as pronotum. Humeri rounded. Surface sheen, finely and densely punctate, intervals microreticulate.

Legs slender. Protibia with 5 (left, basal one tiny) or 4 (right, basal one tiny) teeth along outer margin; apex bifurcate with branches narrowly rounded at tips. Except apical spurs and

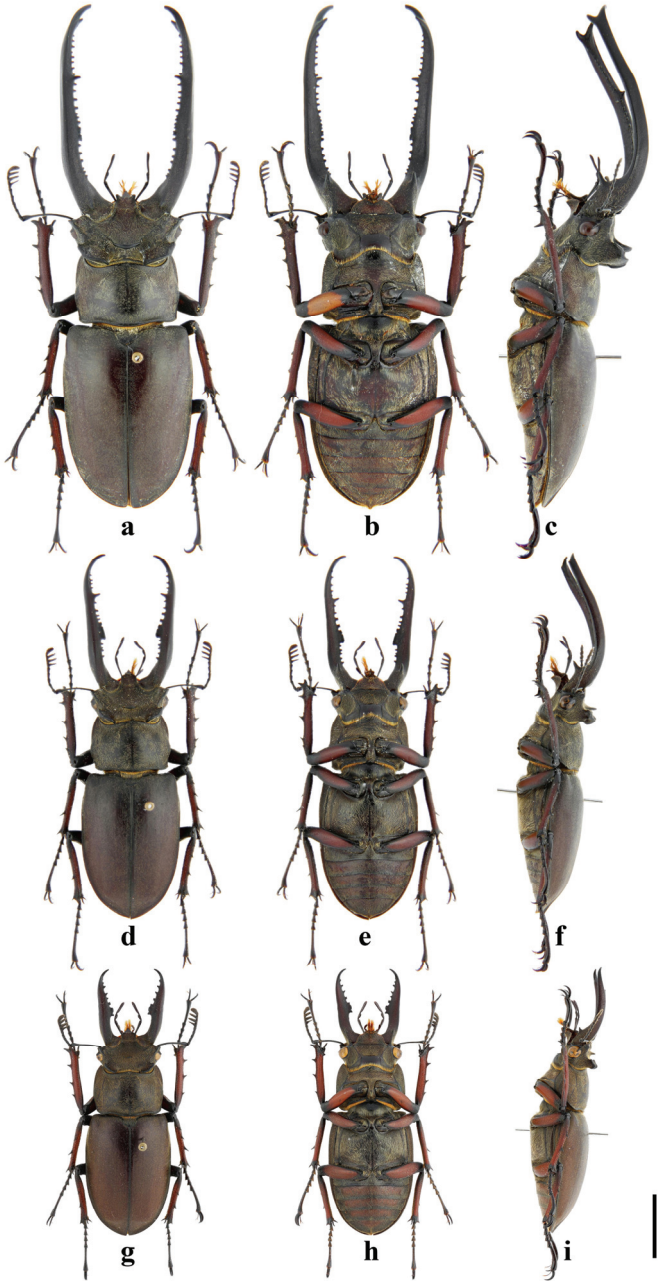

Fig. 3. Male habitus of *Lucanus vitalisi* Pouillaude, 1913 from Yunnan, China. a–c – large size; d–f – moderate size; g–i – small size; (a, d, g – dorsal view; b, e, h – ventral view; c, f, I – lateral view). Scale bar = 1.0 cm.

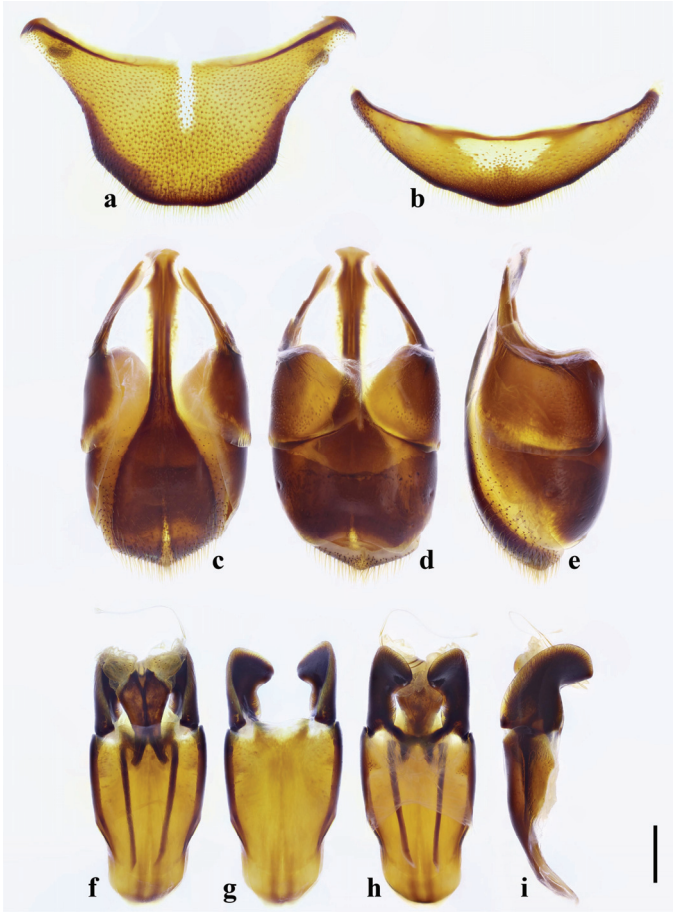

Fig. 4. Male genitalia of *Lucanus vitalisi* Pouillaude, 1913 from Yunnan, China. a – abdominal tergite VIII; b – abdominal sternite VIII; c–e – abdominal segment IX; f–i – aedeagus (penis removed in g); (a, d, h – dorsal view; b, c, f, g – ventral view; e, I – lateral view). Scale bar = 1.0 mm.

spines, mesotibia with 3 (right) or 4 (left, basal one tiny) small lateral spines and metatibia with 3 lateral spines (basal one tiny). Surfaces finely punctate, intervals matt and finely granulose on femora and tibiae, feebly sheen and microreticulate on tarsi.

Male genitalia. Abdominal tergite VIII (Fig. 2a) with subround lateral angles and with longitudinal, thin, membranous stripe in middle of basal 5/9; sternite VIII (Fig. 2b) with transverse, semielliptical, membranous area in middle of basal half. Abdominal sternite IX (Fig. 2c) with apical expansion relatively slender, and with long, membranous, median stripe in apical 5/8; basal stalk not extended laterally. Aedeagus (Fig. 2f) about 2.3 times as long as wide in ventral view. Basal piece (Fig. 2f–h) constricted in basal part, about 1.8 times as long as parameres, with a pair of sclerotized dorsal plates (Fig. 2h); ventral plate (Fig. 2g) bifurcate at apex of distal end, with relatively deep emargination. Paramere with basal process (Fig. 2g–h);

Table 1. Selected important morphological differences between males of *Lucanus niu* sp. n. and *L. vitalisi* Pouillaude, 1913

Characters	***Lucanus niu* sp. n.**	***Lucanus vitalisi***
Body length	large-sized male shorter than 60 mm (Fig. 1a–c)	large-sized male generally longer than 70 mm (Fig. 3a–c)
Color of femora	reddish stripes distinct on ventral surfaces in large-sized male (Fig. 1b), but obscure in moderate-sized and small-sized males (Fig. 1e, h)	reddish stripes distinct on ventral surfaces from large-sized to small-sized males (Fig. 3b, e, h)
Color of tibiae	reddish stripes obscure on ventral surfaces (Fig. 1b, e, h), and absent on dorsal surfaces (protibiae tinged with reddish) (Fig. 1a, d, j)	reddish stripes distinct on ventral surfaces (Fig. 3b, e, h), and obscure on dorsal surfaces (Fig. 3a, d, j)
Mandibles	about 2.3 times as long as head in large-sized male (Fig. 1a–c); inner mandibular margin with unarmed carina at base, preceded by diastema, 7–8 small denticles, major inner tooth, and 2–3 distal small denticles in large-sized male (Fig. 1a, b); major inner tooth relatively more prominent in large-sized male (Fig. 1a, b); apical part thick and strong in moderate-sized and small-sized males (Fig. 1d, e, g, h)	about 3.0 times as long as head in large-sized male (Fig. 3a–c); inner mandibular margin with unarmed carina at base, preceded by diastema, 17–18 small denticles, major inner tooth, and 7–8 distal small denticles in large-sized male (Fig. 3a, b); major inner tooth relatively less prominent in large-sized male (Fig. 3a, b); apical part much more slender in moderate-sized and small-sized males (Fig. 3d, e, g, h)
Head: anterior ridge	narrower; substraight at apical margin	broader; rounded at apical margin
Abdominal sternite VIII	membranous area semielliptical (Fig. 2b)	membranous area trapezoidal (Fig. 4b)
Abdominal sternite IX	apical expansion relatively slender, and with long, membranous, median stripe in apical 5/8 (Fig. 2c)	apical expansion relatively broad, and with short, membranous, median stripe in apical 1/3 (Fig. 4c)
Basal piece	apex of distal end with relatively deep emargination (Fig. 2g)	apex of distal end with relatively shallow emargination (Fig. 4g)
Parameres	apex strongly upturned in lateral view (Fig. 2i)	with apex less strongly upturned in lateral view (Fig. 4i)
Penis	moderately wide, weakly expanded near apex (Fig. 2f)	rather wide, strongly expanded near apex (Fig. 4f)

apex strongly upturned in lateral view (Fig. 2i). Penis (Fig. 2f–h) moderately wide, weakly expanded near apex, 0.2 times shorter than parameres. Flagellum relatively short, about 2.2 times as long as parameres, apex distinctly enlarged.

MALE PARATYPES. Body 43.5–58.0 mm long. All male paratypes consistent with holotype except for usual allometric differences (Fig. 1d–i). Large-sized male like holotype with more pronounced morphological characters, while in small-sized male, mandible strongly shorter, apical fork of mandible less opened to vestigial, number of inner teeth fewer, major inner tooth ill-developed, clypeolabrum shorter, anterior and lateral ridges of head weaker.

FEMALE. Unkown.

DIFFERENTIAL DIAGNOSIS. This new species should be assigned to the *Lucanus laminifer* group (*sensu* Huang & Chen, 2010). It most resembles *Lucanus vitalisi* Pouillaude, 1913 (Figs 3, 4), but can be distinguished by the combination of characters shown in Table 1.

DISTRIBUTION. China (Yunnan).

ETYMOLOGY. The specific epithet is from the Chinese Pinyin "niú [牛]", which means ox, indicating this species was identified as new in 2021, the year of the ox. The name is a noun in apposition.

***Lucanus zenghuae* Wang, He, He et Zhou, sp. n.**

https://zoobank.org/NomenclaturalActs/2ADBCA00-FCE9-4A54-9481-6BF47245A860

Figs 5, 6

MATERIAL EXAMINED. Holotype – ♂, **China**: Yunnan, Honghe Prefecture, Pingbian County, Daweishan [红河州屏边县大围山], 5.VI 2020, Tian-Long He leg. (MAHU). Paratypes (totally 5 ♂): same data as holotype except: 9.VI 2019, 2♂ (CTLH); 2♂, same data as holotype except: 31.V 2021, 1♂ (CTLH) and 1♂ (MYNU), Tian-Long He & Hao Xu leg.; same data as holotype except: 31.V 2021, 1♂ (CCZC), Tian-Long He & Hao Xu leg.

DESCRIPTION. HOLOTYPE MALE. Large size, body 48.6 mm long. Lengths of body parts (mm): head (8.4), mandible (15.9.), pronotum (6.4), elytra (19.7); width (mm): head (15.2), pronotum (11.0), elytra (13.2).

Habitus (Fig. 5a–c). Color mostly reddish brown to blackish brown; elytra reddish; femora and tibiae with reddish stripes on ventral surfaces. Body mostly clothed with short, sparse, recumbent, yellowish pubescence, similar on metaventrite.

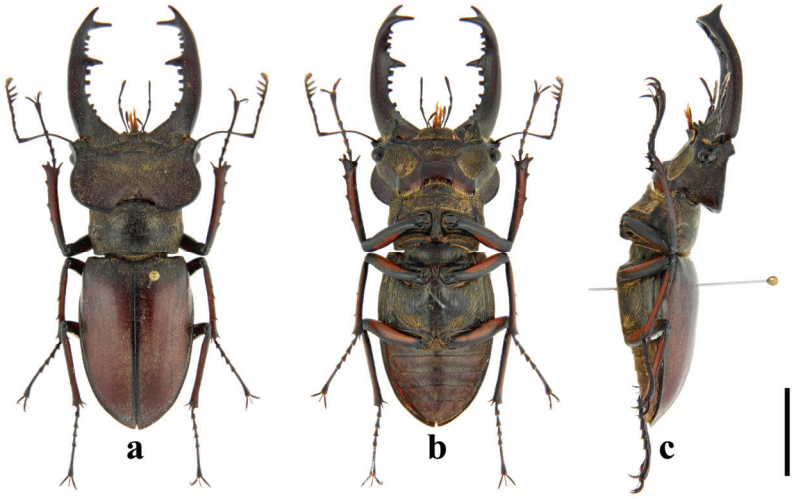

Fig. 5. *Lucanus zenghuae* sp. n., male habitus of holotype. a – dorsal view; b – ventral view; c – lateral view. Scale bar = 1.0 cm.

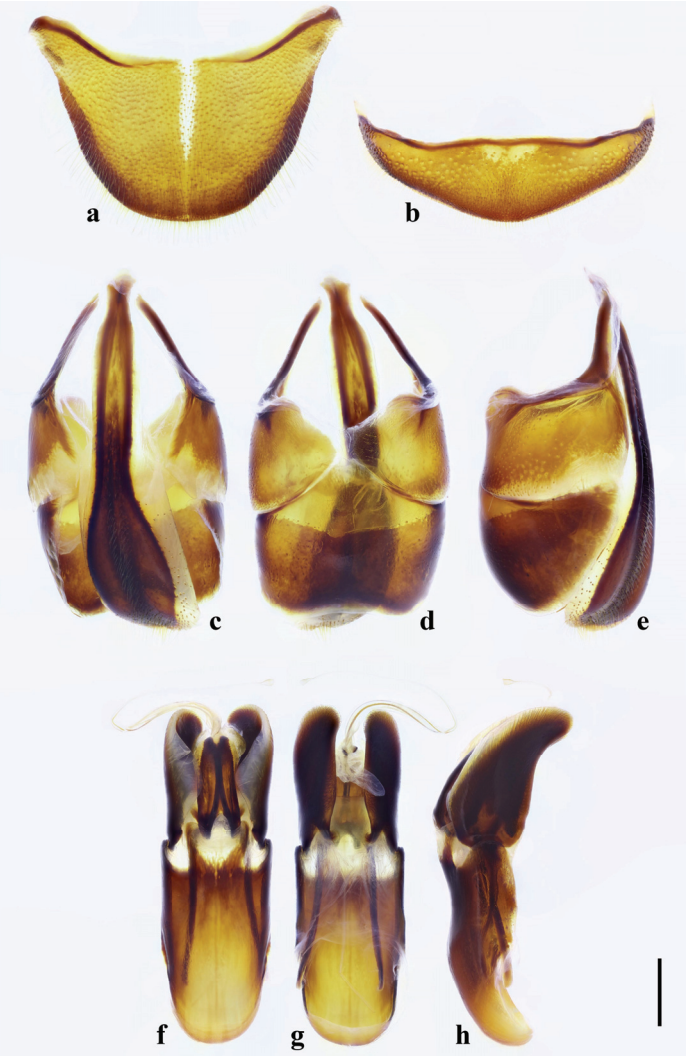

Fig. 6. *Lucanus zenghuae* sp. n., male genitalia of holotype. a – abdominal tergite VIII; b – abdominal sternite VIII; c–e – abdominal segment IX; f–h – aedeagus; (a, d, g – dorsal view; b, c, f – ventral view; e, h – lateral view). Scale bar = 1.0 mm.

Head 1.8 times as wide as long, widest at anterolateral angles; surfaces matt, finely punctate, intervals finely and irregularly granulose. Frons transverse, subtrapezoidal, weakly concave, fused with clypeolabrum. Clypeal ridge strong, not medially interrupted, laterally projecting as two teeth. Labrum subtriangular, rounded at apex. Anterolateral angles subacute, protruding laterally, slightly prominent than eyes. Ocular canthus protruding, shorter than half eye's diameter. Postocular margin gently curved, strongly narrowed posteriorly. Posterior margin widely concave. Anterior ridge weakly elevated, transverve, substraight at

apical margin. Lateral ridges moderately elevated, broad, widely subrounded at apical margins. Mandible moderately long and strong, about 1.9 times as long as head; moderately curved in dorsal and lateral views; surfaces finely punctate, intervals matt and finely granulose at inner side, matt and microrugulate at outer side. Inner mandibular margin with unarmed carina at base, preceded by 5–6 small denticles, major inner tooth, and 4–5 distal small denticles. Major inner tooth situated at apical 2/5, rather strong, slenderly subtriangular, weakly protruded near base of posterior side, shorter than mandibular width, tilting backwards and upwards with apex rounded and not higher than mandible. Apical fork with upper tooth bent upwards and inwards; lower tooth distinctly longer, directed downwards and inwards. Antennal club 4-segmented; antennomere VII with slenderly subtriangular lamella, sharply pointing inwards, only pubescent on apical surface; antennomeres VIII–X with strong, long, pubescent lamellae. Mentum wide, inverted trapezoidal; anterior margin almost straight and with obliquely truncated corners; surface matt, finely punctate, intervals finely and irregularly granulose, and transversely depressed near anterior margin.

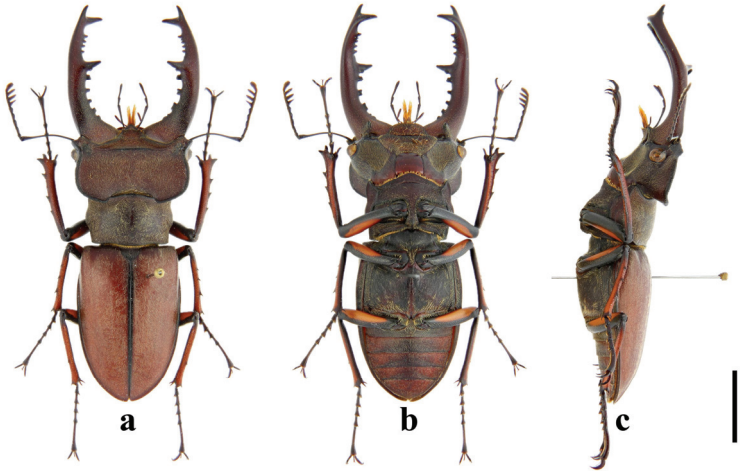

Fig. 7. Male habitus of *Lucanus pesarinii* Zilioli, 1998 from Vietnam. a – dorsal view; b – ventral view; c – lateral view. Scale bar = 1.0 cm.

Pronotum 1.7 times as wide as long, widest at middle. Anterior corners subrounded; posterior corners obtuse. Surface matt, finely punctate, intervals finely and irregularly granulose, and with median longitudinal depression rather shallow. Prosternal apophysis strong, distinctly convex ventrally in middle of posterior part, and truncated at posterior margin.

Scutellum linguiform, about 1.9 times as wide as long, rounded at apical margin. Surface feebly sheen, finely punctate, intervals microrugulate.

Elytra oval, 1.5 times as long as wide, widest around basal 1/3, 3.1 times as long as and 1.2 times as wide as pronotum. Humeri obtuse. Surface weakly sheen, finely and densely punctate, intervals microreticulate.

Legs slender. Protibia with 3 (left, basal one tiny) or 4 (right, basal two tiny) teeth along outer margin; apex bifurcate with branches narrowly rounded at tips. Except apical spurs and spines, mesotibia with 3 (basal one tiny) small lateral spines and metatibia without lateral spines (only one unconspicuous protuberance). Surfaces finely punctate, intervals matt and finely granulose on femora and tibiae, feebly sheen and microreticulate on tarsi.

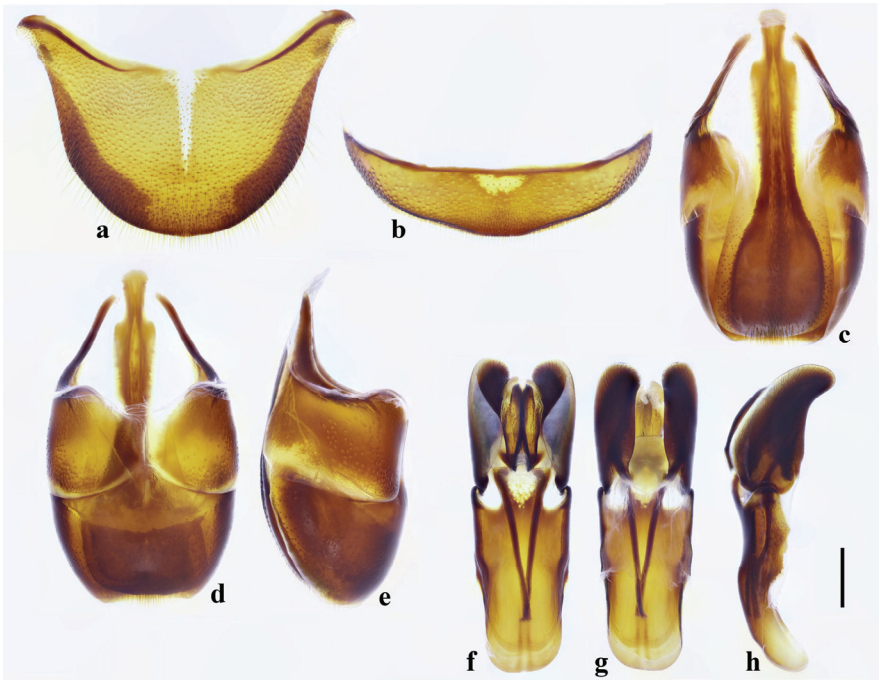

Fig. 8. Male genitalia of *Lucanus pesarinii* Zilioli, 1998 from Vietnam. a – abdominal tergite VIII; b – abdominal sternite VIII; c–e – abdominal segment IX; f–h – aedeagus; (a, d, g – dorsal view; b, c, f – ventral view; e, h – lateral view). Scale bar = 1.0 mm.

Table 2. Selected important morphological differences among males of *Lucanus zenghuae* sp. n., *L. pesarinii* Zilioli, 1998 and *L. derani fukinukiae* Katsura et Giang, 2002

Characters	***Lucanus zenghuae* sp. n.**	***Lucanus pesarinii***	***Lucanus derani fukinukiae***
Color of elytra	reddish (Fig. 5a, c)	orange-red (Fig. 7a, c)	reddish brown to blackish brown (Fig. 9a, c)
Color of femora and tibiae	reddish stripes distinct on ventral surfaces (Fig. 5b, c)	orange-red stripes distinct on ventral surfaces (Fig. 7b, c)	reddish stripes absent or vestigial on ventral surfaces (Fig. 9b, c)
Pubescence of metaventrite	short and sparse as on other parts (Fig. 5b)	short and sparse as on other parts (Fig. 7b)	longer and denser than on other parts (Fig. 9b)
Head: major inner tooth	tilting backwards and upwards with apex not higher than mandible (can not be seen in lateral view) (Fig. 5a, c)	tilting forwards and upwards with apex distinctly higher than mandible (can be seen in lateral view) (Fig. 7a, c)	tilting backwards and upwards with apex distinctly higher than mandible (can be seen in lateral view) (Fig. 9a, c)

Table 2. Continue

Head: distal small denticles	continuous with major inner tooth (Fig. 5a)	distinctly spaced out with major inner tooth (Fig. 7a)	distinctly spaced out with major inner tooth (Fig. 9a)
Head: apical fork	upper tooth more bent inwards, shorter than lower tooth (Fig. 5a)	upper tooth less bent inwards, shorter than lower tooth (Fig. 7a)	upper tooth more bent inwards, not shorter than lower tooth (Fig. 9a)
Head: anterior ridge	weakly elevated, transverve, substraight at apical margin	absent	weakly elevated, transverve, gently curved at apical margin
Protibia	apical branches less open (Fig. 5a)	apical branches more open (Fig. 7a)	apical branches more open (Fig. 9a)
Abdominal sternite VIII	membranous area transverse, semielliptical (Fig. 6b)	membranous area transverse, semiellip-tical (Fig. 8b)	membranous areas bisected into two small parts (Fig. 10b)
Abdominal sternite IX	basal stalk not extended laterally (Fig. 6c, d)	basal stalk extended laterally (Fig. 8c, d)	basal stalk extended laterally (Fig. 10c, d)
Penis	slender, not expanded near apex (Fig. 6f)	wide, expanded near apex (Fig. 8f)	wide, expanded near apex (Fig. 10f)

Male genitalia. Abdominal tergite VIII (Fig. 6a) without lateral angles and with longitudinal, thin, membranous stripe in middle of basal 5/8; sternite VIII (Fig. 6b) with transverse, semielliptical, membranous area in middle of basal part. Abdominal sternite IX (Fig. 6c, e) with apical expansion relatively slender, without membranous area; basal stalk not extended laterally. Aedeagus (Fig. 6f) about 3.0 times as long as wide in ventral view. Basal piece (Fig. 6f, g) weakly constricted in basal part, about 1.4 times as long as parameres, with a pair

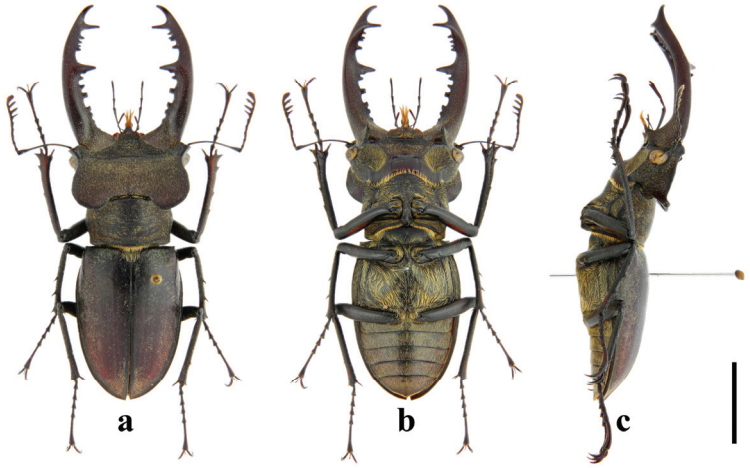

Fig. 9. Male habitus of *Lucanus derani fukinukiae* Katsura et Giang, 2002 from Yunnan, China. a – dorsal view; b – ventral view; c – lateral view. Scale bar = 1.0 cm.

of sclerotized dorsal plates (Fig. 6g); ventral plate (Fig. 6f) bifurcate at apex of distal end, with relatively deep emargination. Paramere with basal process (Fig. 6g); apex moderately upturned in lateral view (Fig. 6h). Penis (Fig. 6f) slender, 0.4 times shorter than parameres. Flagellum relatively short, about 2.2 times as long as parameres, apex distinctly enlarged.

MALE PARATYPES. Body 34.5–49.1 mm long. All male paratypes consistent with holotype except for usual allometric differences. Large-sized male like holotype with more pronounced morphological characters, while in small-sized male, mandible shorter, apical fork of mandible less opened, number of inner teeth fewer, major inner tooth ill-developed, clypeolabrum shorter, anterior and lateral ridges of head weaker.

FEMALE. Unkown.

DIFFERENTIAL DIAGNOSIS. This new species should be assigned to the *Lucanus fortunei* group (*sensu* Huang & Chen, 2010). It is most similar to *L. pesarinii* Zilioli, 1998 (Figs 7, 8) and *L. derani fukinukiae* Katsura et Giang, 2002 (Figs 9, 10), but can be distinguished by the combination of characters shown in Table 2.

ETYMOLOGY. The new species is dedicated to Zeng-Hua Tang, the mother of the collector Tian-Long He. The name is a noun in the genitive case.

DISTRIBUTION. China (Yunnan).

Fig. 10. Male genitalia of *Lucanus derani fukinukiae* Katsura et Giang, 2002 from Yunnan, China. a – abdominal tergite VIII; b – abdominal sternite VIII; c–e – abdominal segment IX; f–h – aedeagus; (a, d, g – dorsal view; b, c, f – ventral view; e, h – lateral view). Scale bar = 1.0 mm.

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