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Nargus (*Eunargus*) *celli* sp. nov. (Coleoptera: Leiodidae: Cholevinae: Cholevini), a new species from China

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Abstract

Nargus (*Eunargus*) *celli* **sp. nov.** (Coleoptera: Leiodidae: Cholevinae: Cholevini) is described from Guangxi autonomous region, China. Important morphological characters of examined species of *Eunargus* Perreau are illustrated by color plates or line drawings. A key to three known species of the subgenus *Eunargus* Perreau is compiled, and known distribution is mapped.

Key words: Leiodidae, Cholevinae, *Nargus*, *Eunargus*, taxonomy, new species, China

摘要

本文描述了产自中国广西自治区的沙鲁衲小葬甲 *Nargus* (*Eunargus*) *celli* **sp. nov.**（鞘翅目：球蕈甲科：小葬甲亚科，小葬甲族）。我们以彩色图版或线条图来阐明真衲小葬甲亚属 *Eunargus* Perreau 已检视种之重要形态特征，编制了一个该亚属三个种的检索表，并且绘制了分布图。

Introduction

The subgenus *Eunargus* of the genus *Nargus* Thomson, 1867 was erected by Perreau (1996b) for a single species, *Nargus taiwanensis* Perreau, 1996 from Taiwan Island. The following year, Perreau (1997) added one additional species, *Nargus franki* Perreau, 1997 from Fujian and Zhejiang provinces, China. This subgenus is distinguished from the other two subgenera *Nargus* s. str. and *Demochrus* Thomson, 1867, mainly on its very peculiar aedeagal structure (Perreau, 1996a; 1996b; 1997).

The subgenus *Eunargus* Perreau is a very small group and had only two described species before this study. They were both recorded from China and represented only by a few specimens; the group appears to be rare and infrequently collected. This paper describes and illustrates a new species, namely *Nargus* (*Eunargus*) *celli* **sp. nov.**, collected from Napo, Guangxi autonomous region in southern China. Important morphological characters of the species examined are illustrated by color plates or line drawings. A key to three known species of the subgenus *Eunargus* Perreau is compiled, and known distribution is mapped. The holotype of the new species is housed in the Institute of Zoology, University of Chinese Academy of Sciences (IZ-CAS).

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Materials and methods

Specimens were relaxed and softened in a hot saturated solution of potassium hydroxide for 4 minutes (for mounted dry specimens) or 8 minutes (for alcohol-preserved specimens), and then transferred to distilled water to rinse the residual potassium hydroxide off and stop any further bleaching. The softened specimens were moved into glycerin and dissected there to observe morphological details. After examination, the body parts were mounted on a plastic slip with Gum Arabic for future studies. Observation, drawing and measurement were performed using a Leica MZ APO stereomicroscope (magnification up to ×250) with a squared eyepiece graticule. Some microstructures were observed under an Axio Zoom.V16 motorized stereo zoom microscope (magnification up to ×270). Color photographs were taken with an AxioCam MRc 5 and the final deep focus images were created with the stacking software Helicon Focus 5.3. The program Adobe Photoshop® CS6 was used to make the line-art plates.

The material examined for this study is deposited in the following collections and museums:

CJFR Collection of Jürgen Frank, Waiblingen, Germany

CJRZ Collection of Jan Růžička, Prague, Czech Republic

IZ-CAS Institute of Zoology, University of Chinese Academy of Sciences, Beijing, China

OUMNH Oxford University Museum of Natural History, Oxford, England (D. J. Mann)

The following abbreviations are used for measurement in millimeters (mm):

AL (antennal length): length from the antennal base to its tip.

BTW (basitarsal width): width of the widest portion of 1st protarsomere.

EBL (Extended body length): summation of HL, PL, ELL and length of exposed scutellum, preventing the error introduced by exposed or retracted head.

ELL (elytral length): length from the tail end of scutellum to the elytral apex.

ELW (elytral width): width of the widest portion of two elytra closed together.

EW (eye width): width of a single compound eye in dorsal view.

HL (head length): axial length from the anterior apex of clypeus through the posterior margin of occipital carina.

HW (head width): width of the widest portion of head (usually including eyes).

PL (pronotal length): axial length of the pronotum.

PW (pronotal width): width of the widest portion of pronotum.

TW (tibial width): width of the widest portion of protibia (excluding spines along outer margin etc.).

Taxonomy

Genus *Nargus* Thomson, 1867

Thomson, 1867: 349 (*Nargus*; species included: *velox*); Reitter, 1884: 43 (*Choleva* (*Nargus*); key to species); Hatch, 1928: 170 (*Nargus*; catalog); Jeannel, 1936: 225 (*Nargus*; characters; distributions; key to species); Szymczakowski, 1964: 177 (*Nargus*; characters); Perreau, 2000: 99 (*Nargus*; world catalog; 47 species); Salgado et al., 2008: 142 (*Nargus*; characters).

Type species: *Choleva velox* Spence, 1813, by monotypy.

Subgenus *Eunargus* Perreau, 1996

Perreau, 1996b: 944 (*Nargus* (*Eunargus*); species included: *taiwanensis*); Perreau, 2000: 105 (*Nargus* (*Eunargus*); world catalog; 2 species).

Type species: *Nargus taiwanensis* Perreau, 1996a, by original designation.

Diagnosis. Large body size compared to other subgenera; pronotal hind corners absent, completely rounded; protibiae without fringe of small spines on apical and dorsal margin, outer spurs visible; aedeagus with median lobe divided into two parts: dorsal and ventral laminae; internal sac with isolate and extremely developed tooth, approximately as long as median lobe of aedeagus (Perreau, 1996a; 1996b; 1997).

Distribution. China (Fig. 1).

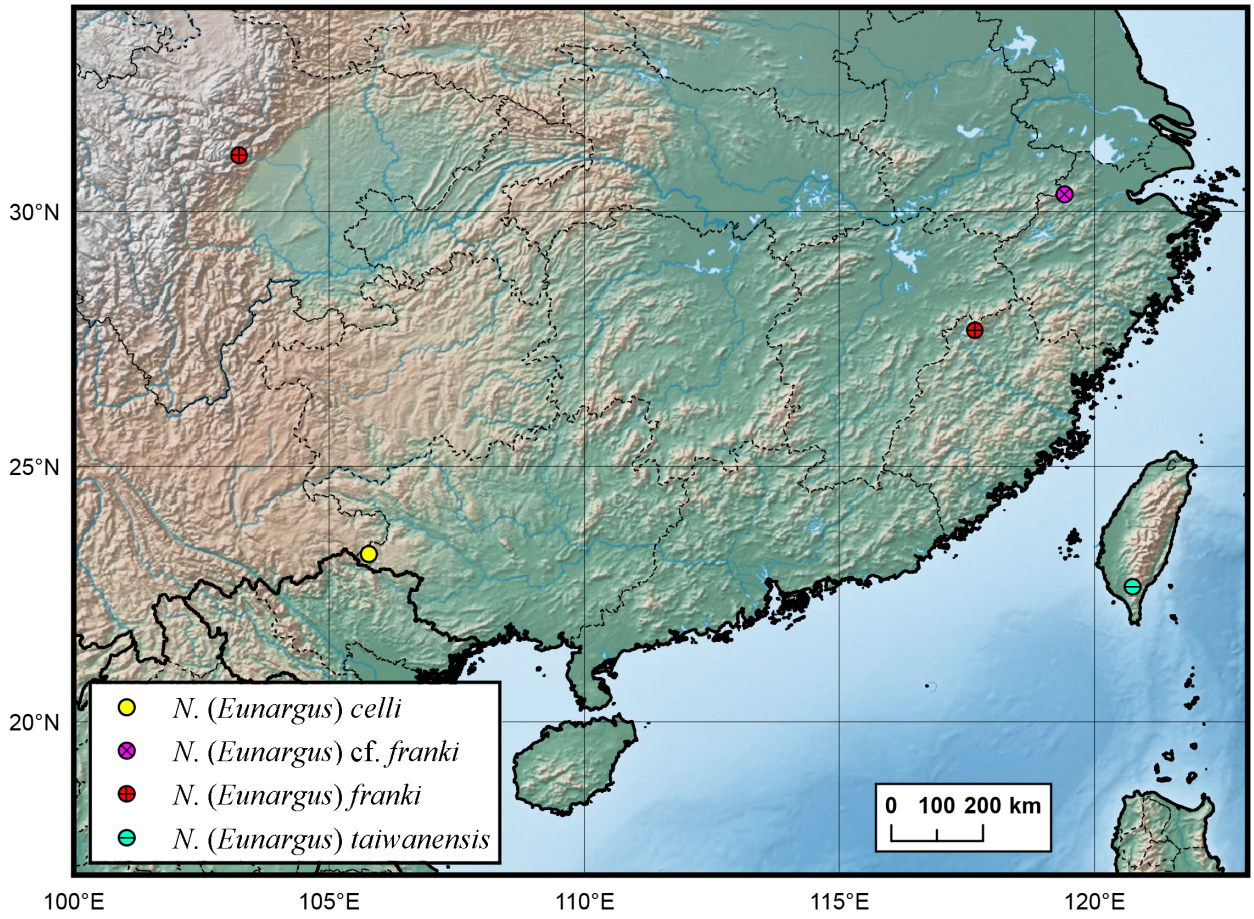

FIGURE 1. Distribution map of *Nargus* (*Eunargus*) species.

Key to males of the subgenus *Eunargus* Perreau of the genus *Nargus* Thomson

1 Metathoracic wings absent; apical angles of elytra elongated into two very strong teeth that overlap each other; parameres distinctly shorter than median lobe . . . . . *N.* (*E.*) *taiwanensis* Perreau
- Metathoracic wings fully developed; elytral apices wide, not elongated; parameres slightly longer than median lobe 2
2 Each elytron yellowish-brown with a large blackish-brown spot at middle; abdominal ventrite VIII very shallowly and widely emarginate on posterior margin; aedeagus in dorsal view with dorsal lamina slender and only slightly sinuate, ventral lamina situated at right side; large tooth of internal sac projected outward from median lobe; parameres in lateral view almost with equal width throughout whole length . . . . . *N.* (*E.*) *franki* Perreau
- Elytra dark brown, concolorous, without any spots; abdominal ventrite VIII deeply emarginate beside large median protrusion on posterior margin; aedeagus in dorsal view with dorsal lamina robust and abruptly turned left in apical part, ventral lamina situated at left side; large tooth of internal sac not projected outward from median lobe; parameres in lateral view very widened around middle . . . . . *N.* (*E.*) *celli* **sp. nov.**

Nargus (*Eunargus*) *franki* Perreau, 1997

(Figs. 2A–B; 3A–J; 4A–F)

Perreau, 1997: 447 (*Nargus* (*Eunargus*); Type locality: CHINA: Fukien, Kuatun [ca. 27°40′N 117°40′E]); Perreau, 2000: 105 (*Nargus* (*Eunargus*); in catalog).

Material examined. CHINA, Fujian: 1♂, Kuatun [ca. 27°40′N 117°40′E], 8.IV.1946, Tschung sen. leg. // Nargus (Eunargus) / franki Perreau, 1997 / Jan Růžička det. 2005 (CJFR); 1♂, same data as previous (CJRZ); 1♀, Kuatun, 25.IV. [19]46, Tschung sen. leg. // Nargus (Eunargus) / franki Perreau, 1997 / Jan Růžička det. 2005 (CJFR); **CHINA, Sichuan:** 1♂, 2♀, Wolong Natur. Res. [ca. 31°06′N 103°15′E], 900 m, litter, 23. V.1994, Kurbatov [leg.] // Nargus (Eunargus) / franki Perreau, 1997 / Jan Růžička det. 2005 (CJFR); 1♀, same data as previous (CJRZ).

Redescription. *Male*. EBL: 3.8 mm. Length of different body parts: HL : AL : PL : ELL = 0.6 : 1.6 : 0.9 : 2.1 mm; width: HW : EW : PW : ELW = 1.0 : 0.1 : 1.4 : 1.6 mm. Proportion of antennomeres from base to tip in μm (length × width): 175 × 87, 164 × 68, 157 × 73, 125 × 67, 118 × 69, 112 × 75, 139 × 83, 92 × 86, 126 × 100, 130 × 108, 191 × 105.

Habitus (Fig. 2A) oval, rather convex and sublustrous. Moderately pigmented: mostly yellowish-brown; antennomeres 6 to 10 somewhat darker; each elytron with a large blackish-brown spot at middle. Dorsum continually covered with fine, recumbent, sallow pubescence.

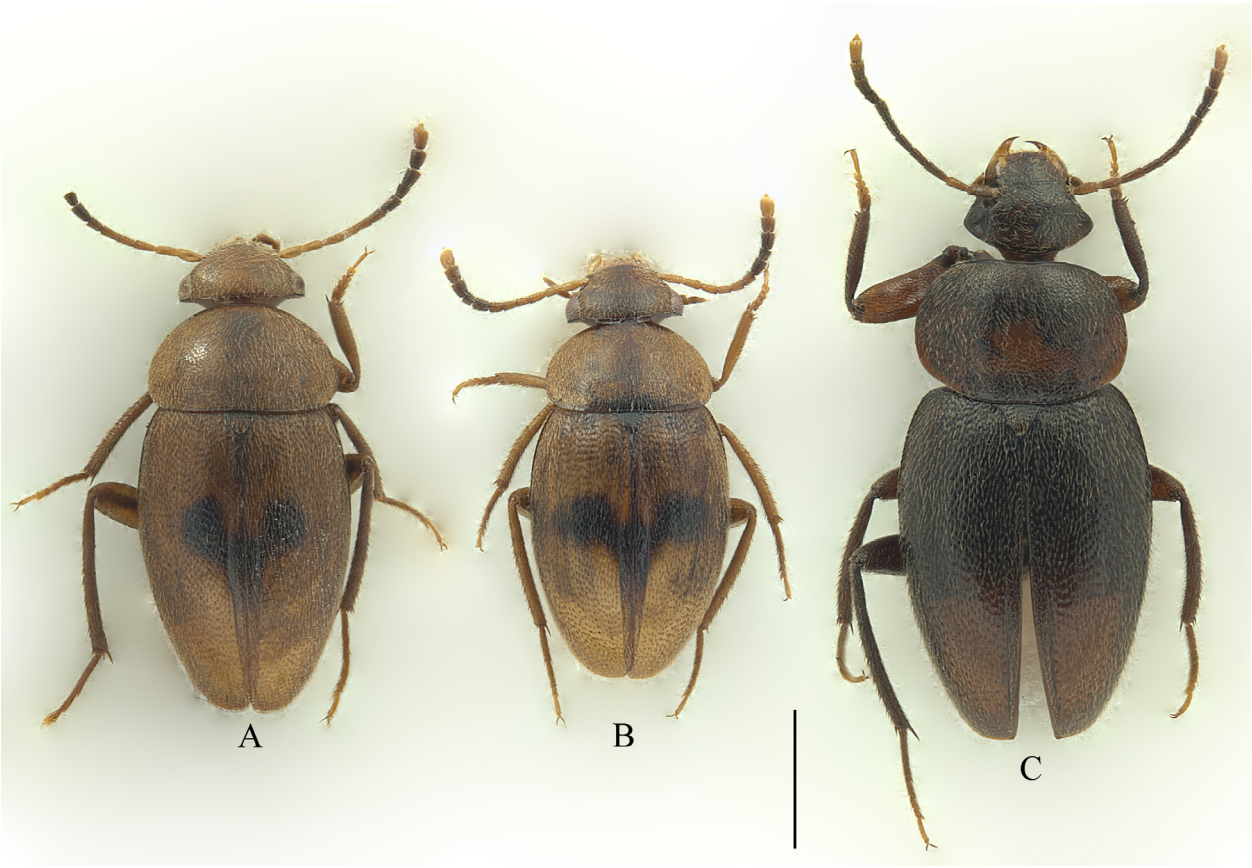

FIGURE 2. ***Nargus* (*Eunargus*) *franki* Perreau, 1997: A**, habitus ♂ (dorsal view; from Fujian); **B**, habitus ♀ (dorsal view; from Sichuan). ***Nargus* (*Eunargus*) *celli* sp. nov.: C**, habitus ♂ (dorsal view). Scales: 1 mm.

Head retractile, HW / HL = 1.5. Surface covered with fine punctures, separated about 5–6 times of their diameter, interspaces with reticulate microsculpture. Frontoclypeal suture distinct. Clypeus subtrapezoidal, anterior margin substraight. Compound eyes well developed, EW / HW = 0.1. Antennae (Fig. 3A) slender and long, AL / HW = 1.7; all antennomeres longer than wide; antennomere 3 slightly shorter than 2; antennomere 6 with length / width = 1.5; 11th longest, rather elongated.

Pronotum (Fig. 3B) transverse, widest at about basal 2/5, PW / PL = 1.6. Sides rounded, regularly narrowing forward and backward from the widest point; hind corners absent, completely rounded. Posterior margin shallowly and widely emarginate in middle. Surface covered with fine punctures, interspaces with reticulate microsculpture.

Elytra widely oval, widest at about basal 3/8, ELL / EW = 1.3. Sides regularly curved, gradually narrowing from the widest point to apices; apices (Fig. 3G) widely subrounded. Sutural striae present. Surface covered with fine punctures, interspaces with sparse microtrichiae. Metathoracic wings fully developed.

Prolegs thin and slender, with basal three protarsomeres (Fig. 3C) expanded: TW / BTW = 1.3. Protibiae (Fig. 3E) slightly dilated around middle and weakly narrowed towards apex. Profemora wider than protibiae. Mesotibiae slightly curved, mesotarsi simply linear. Metatibiae straight.

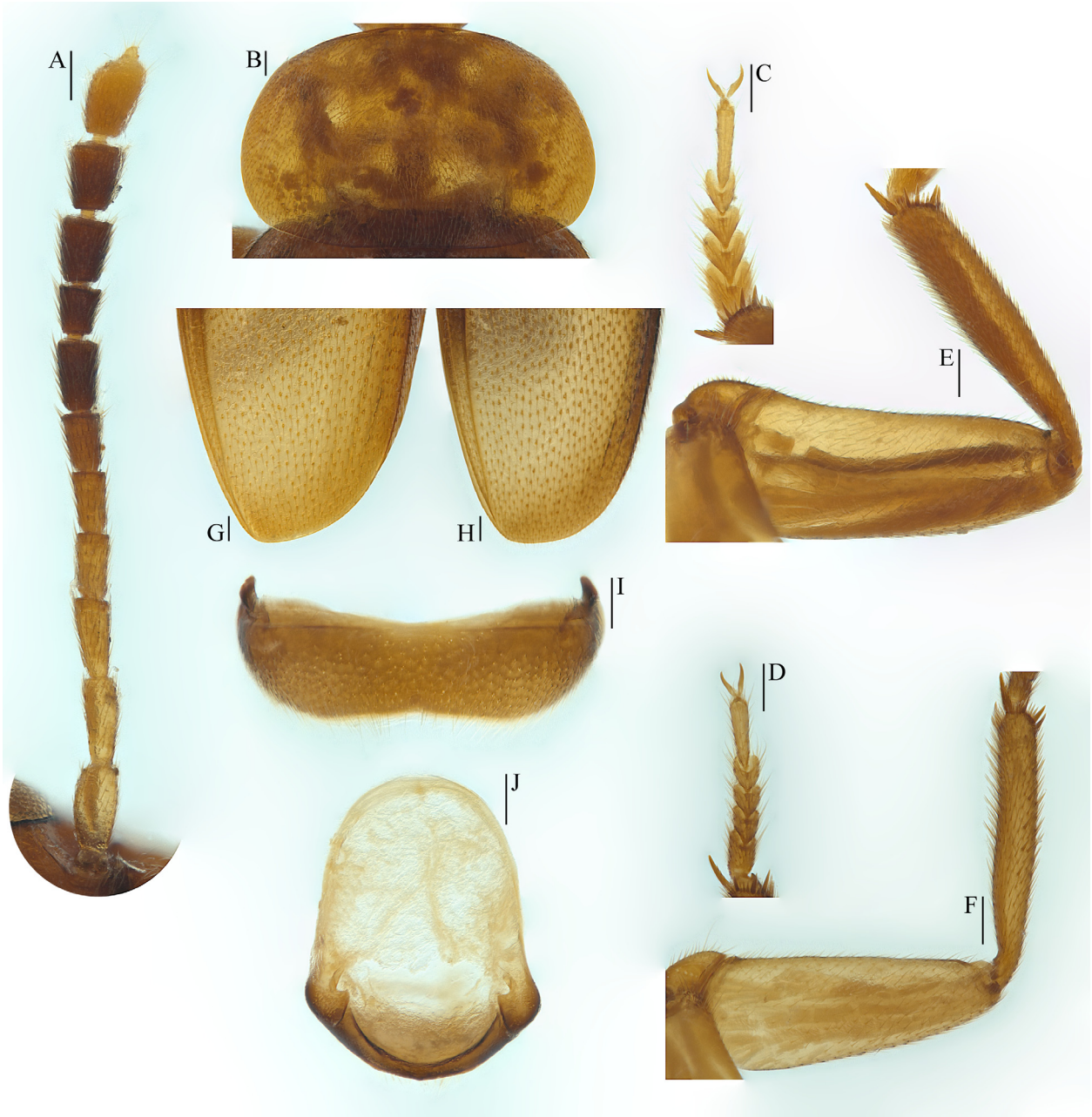

FIGURE 3. ***Nargus* (*Eunargus*) *franki* Perreau, 1997: A**, antenna ♂ (dorsal view); **B**, pronotum ♂ (dorsal view); **C**, protarsus ♂ (dorsal view); **D**, protarsus ♀ (dorsal view); **E**, protibia & profemur ♂ (dorsal view); **F**, protibia & profemur ♀ (dorsal view); **G**, elytral apex ♂ (dorsoapical view); **H**, elytral apex ♀ (dorsoapical view); **I**, ventrite VIII ♂ (ventral view); **J**, genital segment ♂ (ventral view). Scales: 0.1 mm.

Abdominal ventrite VIII (Fig. 3I) very shallowly and widely emarginate on posterior margin. Genital segment (Fig. 3J) long and elliptical, with spiculum gastrale weakly sclerotized; genital plate narrow; tergite IX rounded ventro-apically.

Aedeagus (Figs. 4A–C) with median lobe divided into two laminae: in dorsal view (Fig. 4A), dorsal lamina extended over entire width of median lobe, strongly acuminated into a narrow, obliquely truncated apex, and bearing ca. 4 long and strong setae subapically on right side; while ventral lamina strongly and transversely reduced, shorter than dorsal lamina, situated at right side, with hook-like apex. Large tooth of internal sac extremely developed, slender and sinuate, projecting outward from median lobe. Parameres slender, slightly longer than median lobe, distinctly constricted below apices, each with two apical setae. In lateral view (Fig. 4C), median lobe regularly bent ventrad, large tooth of internal sac upturned, and parameres almost with equal width throughout whole length. Internal sac with many minute denticles in basal part.

FIGURE 4. ***Nargus* (*Eunargus*) *franki* Perreau, 1997: A**, aedeagus (dorsal view); **B**, aedeagus (ventral view); **C**, aedeagus (lateral view); **D**, ventrite VIII ♀ (ventral view); **E**, ovipositor (dorsal view); **F**, ovipositor (ventral view). Scales: 0.1 mm.

Female. Similar to male in general appearance (Fig. 2B), but can be distinguished from following characters: protarsi (Fig. 3D) simply linear; protibiae (Fig. 3E) more slender; elytral apex (Fig. 3H) slightly wider; ventrite VIII (Fig. 4D) gently rounded at posterior margin, and with widely rounded spiculum ventrale; valvifer (Figs. 4E&F) with 1 lateral seta; coxite (Figs. 4E&F) with 3 subapical setae and 1 fine lateral seta; stylus (Figs. 4E&F) minute, cylindrical, with 1 long apical seta.

Affinities. *Nargus* (*Eunargus*) *franki* Perreau is easily distinguished from other members of this subgenus by the combination of the following characters: body size small (3.8 mm); mostly yellowish-brown, each elytron with a large blackish-brown spot at the middle; metathoracic wings fully developed; aedeagus with dorsal lamina slender, with narrow apex; ventral lamina situated at right side in dorsal view, shorter than dorsal lamina; large tooth of internal sac simple, projected outward from median lobe; parameres slender, slightly longer than median lobe, and in lateral view almost with equal width throughout whole length.

Distribution. China (Fujian, Sichuan) (Fig. 1).

Remarks. We also examined two female paratypes, labeled "**CHINA, Zhejiang:** Lin'an County, 500m, W. Tianmu Shan N. R. [ca. 30°20′N 119°25′E], 16.V.1996, J. Cooter // *Cryptomeria* - *Liriodendron* dominant high forest leaf litter. Winkler extractor // PARATYPE / NARGUS (EUNARGUS) FRANKI n. sp. / M. Perreau det. 1997 (CJRZ, OUMNH)". After dissection, we found its metathoracic wings strongly reduced and ventrite VIII with narrowly subtriangular spiculum ventrale that is obviously different from *Nargus* (*Eunargus*) *franki*. Therefore, we think that they can represent an undescribed species very close to *N.* (*E.*) *franki*. Until discovery of male, we refrain from its formal description.

Nargus (*Eunargus*) *taiwanensis* Perreau, 1996

Perreau, 1996a: 294 (*Nargus*; type locality: CHINA, Taiwan: Pingtung Hsien, Peitawushan [ca. 22°38′N 120°45′E], above Kuai-Ku hut, 2750 m); Perreau, 1996b: 944 (*Nargus* (*Eunargus*); status change). Perreau, 2000: 105 (*Nargus* (*Eunargus*); in catalog).

Material examined. None.

Affinities. *Nargus* (*Eunargus*) *taiwanensis* Perreau, according to the original description, is easily to distinguish from other members of this subgenus by the combination of the following characters: body size small (3.6 mm) and uniformly brown, including elytra; metathoracic wings absent; apical angles of elytra elongated into two very strong teeth that overlap each other; aedeagus with dorsal lamina robust, with straight, slightly assymetrical apex; ventral lamina situated at left side in dorsal view, distinctly longer than dorsal lamina; large tooth of internal sac strongly sinuate, not projected outward from median lobe; parameres relatively slender, distinctly shorter than median lobe, and in lateral view gradually widened towards subapex and then narrowed apically.

Distribution. China (Taiwan) (Fig. 1).

Nargus (*Eunargus*) *celli* sp. nov.

(Figs. 2C; 5A–G; 6A–F)

Type locality. CHINA, Guangxi: Napo, Defu Nature Reserve [ca. 23°17′N 105°47′E], 1400 m.

Type material. Holotype: CHINA, Guangxi: ♂, Napo, Defu Nature Reserve, 1400 m, aspirator, 3–5.VI.1998, Min Wu leg. (IZ-CAS).

Description. *Male*. EBL: 4.4 mm. Length of different body parts: HL : AL : PL : ELL = 0.7 : 1.8 : 1.1 : 2.4 mm; width: HW : EW : PW : ELW = 1.0 : 0.1 : 1.6 : 2.0 mm. Proportion of antennomeres from base to tip in μm (length × width): 181 × 86, 167 × 67, 188 × 66, 146 × 62, 145 × 67, 124 × 72, 155 × 90, 92 × 85, 139 × 100, 139 × 103, 216 × 98.

Habitus (Fig. 2C) oval, rather convex and sublustrous. Well pigmented: mostly dark brown; mouthparts, basal two and ultimate antennomeres, protarsi and apex of meso- and metatarsi more or less yellowish. Dorsum continually covered with fine, recumbent, sallow pubescence.

Head retractile, HW / HL = 1.4. Surface covered with fine punctures, separated about 3–5 times of their diameter, interspaces with reticulate microsculpture. Frontoclypeal suture distinct. Clypeus subtrapezoidal, anterior margin substraight. Compound eyes well developed, EW / HW = 0.1. Antennae (Fig. 5A) very slender and very long, AL / HW = 1.8; all antennomeres longer than wide; antennomere 3 distinctly longer than 2; antennomere 6 with length / width = 1.7; antennomere 11 longest, rather elongated.

Pronotum (Fig. 5B) transverse, widest around middle, PW / PL = 1.6. Sides rounded, regularly narrowing forward and backward from the widest point; hind corners absent, completely rounded. Posterior margin shallowly and narrowly emarginate in middle. Surface covered with fine punctures, interspaces with reticulate microsculpture.

Elytra widely oval, widest at about basal 1/3, ELL / EW = 1.2. Sides regularly curved, gradually narrowing from the widest point to apices; apices (Fig. 5E) widely truncated and with inner angle obtusely rounded. Sutural striae present. Surface covered with fine punctures, interspaces with microtrichiae. Metathoracic wings fully developed.

Prolegs thin and slender, with basal three protarsomeres (Fig. 5C) weakly expanded: TW / BTW = 1.1. Protibiae (Fig. 5D) slightly dilated below middle and weakly narrowed towards apex. Profemora wider than protibiae. Mesotibiae slightly curved, mesotarsi simply linear. Metatibiae substraight.

Abdominal ventrite VIII (Fig. 5F) deeply emarginate beside large median protrusion on posterior margin. Genital segment (Fig. 5G) wide and subtriangular, with spiculum gastrale small; genital plate narrow; tergite IX widely rounded ventro-apically.

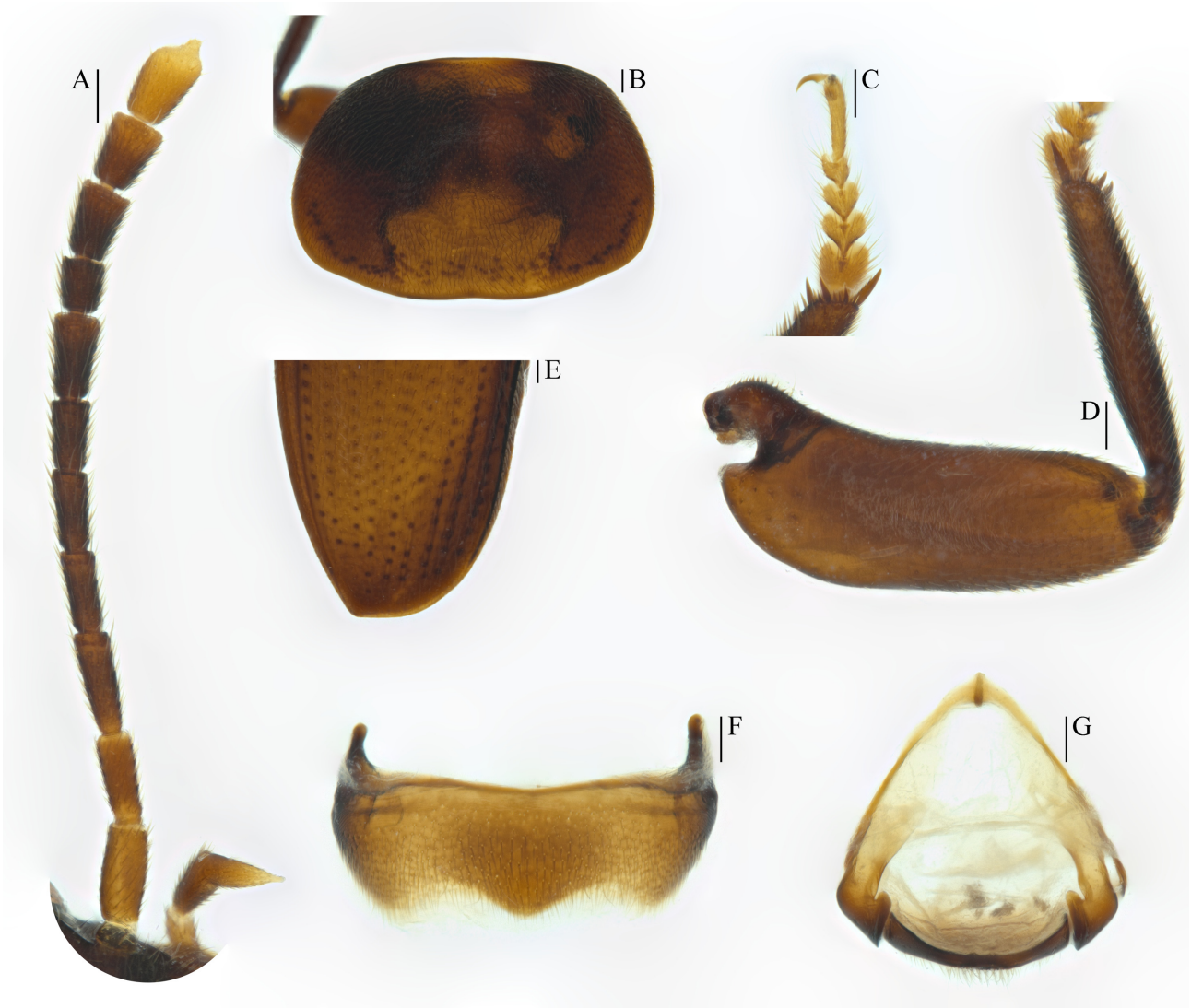

FIGURE 5. ***Nargus* (*Eunargus*) *celli* sp. nov.** ♂**: A**, antenna (dorsal view); **B**, pronotum (dorsal view); **C**, protarsus (dorsal view); **D**, protibia & profemur (dorsal view); **E**, elytral apex (dorsoapical view); **F**, ventrite VIII (ventral view); **G**, genital segment (ventral view). Scales: 0.1 mm.

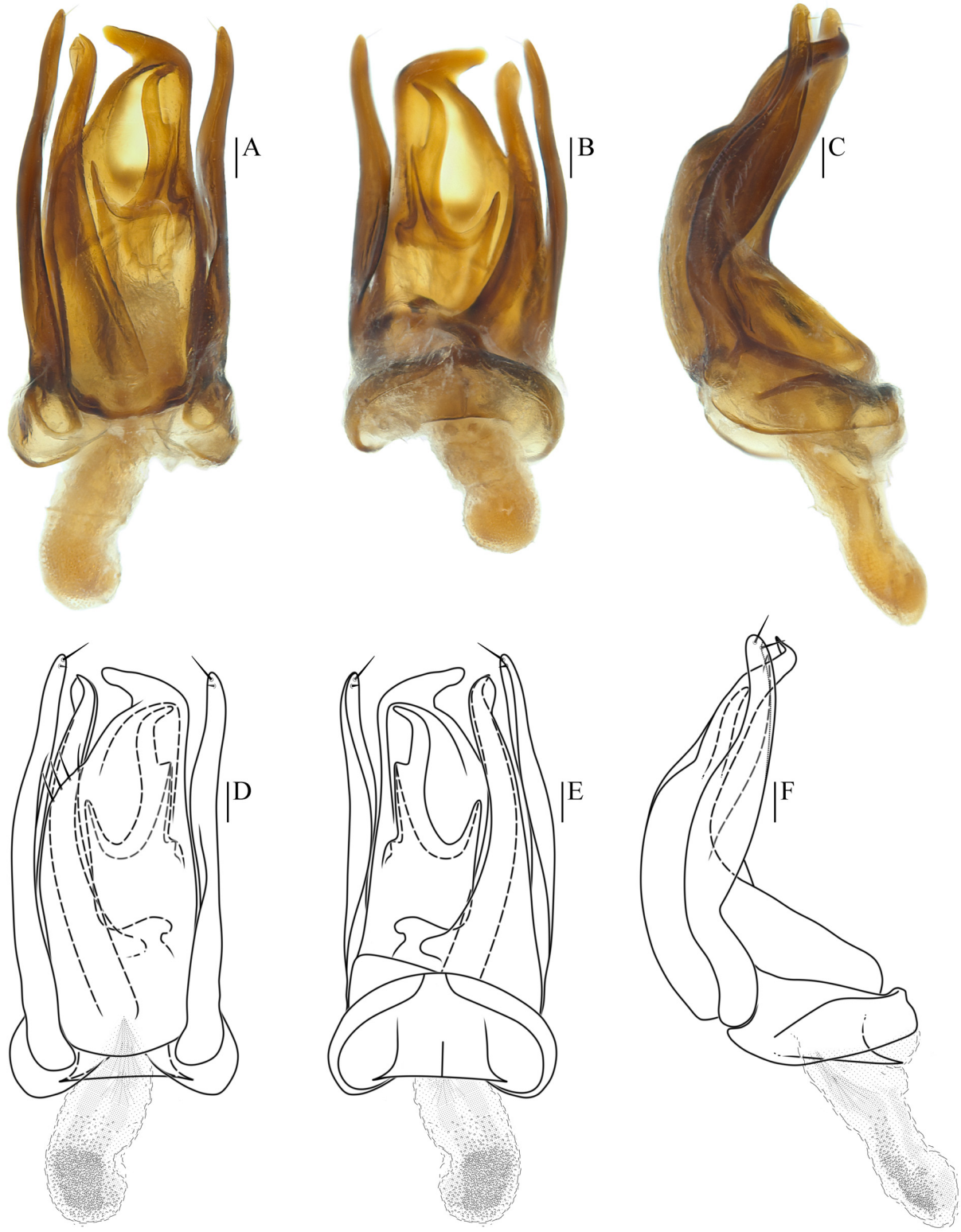

FIGURE 6. ***Nargus* (*Eunargus*) *celli* sp. nov.: A** & **D**, aedeagus (dorsal view); **B** & **E**, aedeagus (ventral view); **C** & **F**, aedeagus (lateral view). Scales: 0.1 mm.

Aedeagus (Figs. 6A–F) with median lobe divided into two laminae: in dorsal view (Figs. 6A&D), dorsal lamina extended over entire width of median lobe, abruptly turning to left side at apical part where covered with micro-setae, and bearing ca. 4 long and strong setae on left side above middle; while ventral lamina slender, strongly and transversely reduced, slightly shorter than dorsal lamina, situated at left side. Large tooth of internal sac extremely developed and with two apices, left one short and straight, right one long and turned to right side at apical part in dorsal view. Parameres rather wide and robust, slightly longer than median lobe, each with two apical setae. In lateral view (Figs. 6C&F), median lobe strongly bent ventrad and parameres very widened around middle. Internal sac with many minute denticles in basal part.

Female. Unknown.

Affinities. *Nargus* (*Eunargus*) *celli* **sp. nov.** is easily distinguished from other members in this subgenus by the combination of the following characters: distintly larger body size (4.4 mm) and uniformly dark brown, including elytra; metathoracic wings fully developed; aedeagus with dorsal lamina robust, abruptly turning left in apical part in dorsal view; ventral lamina straight, situated at left side in dorsal view, slightly shorter than dorsal lamina; large tooth of internal sac with two apices, not projected outwards from median lobe; parameres wide and robust, slightly longer than median lobe, and in lateral view very widened around middle.

Etymology. The specific epithet is from the name of "Cell", a fictional character, an insect-like humanoid in the *Dragon Ball* manga series created by Akira Toriyama.

Distribution. China (Guangxi) (Fig. 1).

Discussion

Although *Nargus* (*Eunargus*) *celli* **sp. nov.** is erected on the basis of just one single male specimen (same condition as *N*. (*E*.) *taiwanensis* Perreau), it is not a problem at all to differentiate it from other congeners, given its distinctive characters mentioned above. The first author is an insect-obsessed eccentric and the first Chinese researcher on the taxonomy of Leiodidae, which is one of the important research objects he will dedicate his life to. Although the research material and funding within the scope of the current study are restricted, there is no doubt that he will try his best to collect more and more *Nargus* specimens from China through different channels in the future.

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