

SHORT COMMUNICATION

A new species of the genus *Anomala* from southern China (Coleoptera: Scarabaeidae: Rutelinae)

Ming Zhi ZHAO

College of Agriculture, South China Agricultural University, Guangzhou 510642, P. R. China; e-mail: zhaomzhai@126.com

Accepted:
6th September 2019

Published online:
26th September 2019

Abstract. A new species of the genus *Anomala* Samouelle, 1819, *Anomala consanguinea* sp. nov. is described from Hainan and Guangdong Provinces, southern China. It is closely related to Oriental *Anomala esmeralda* Prokofiev, 2015, *A. russiventris* Fairmaire, 1893, and *A. inepta* Ohaus, 1916. Diagnostic characters of these species are provided and compared. In addition, their relationships are briefly discussed. *Anomala inepta* is recorded from Sabah, Malaysia for the first time.

Key words. Coleoptera, Scarabaeidae, Rutelinae, *Anomala*, taxonomy, new species, China, Oriental Region

Zoobank: <http://urn:lsid:zoobank.org:pub:C3D57CFF-16A3-4900-80A1-E8FF7AC6E782>

© 2019 The Authors. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Licence.

Introduction

Anomala Samouelle, 1819 is the most species-rich ruteline genus and abundant in the Old World (KRAJČÍK 2007). Totally, 208 species and 8 subspecies have been recorded from China hitherto (ZORN & BEZDĚK 2016, ZORN et al. 2017). Revisional works concerning *Anomala* species from Hainan and Fujian Provinces, southern China, were conducted by LIN (2002a,b). Subsequently, only eleven species plus one subspecies of the genus *Anomala* were described from southern China (ZHANG & LIN 2008, ZORN 2011, PROKOFIEV 2015). The present paper aims to describe a new species of *Anomala*, a mountain-inhabiting leaf chafer, which is common in Hainan Province, southern China.

Material and methods

Adults were collected by light trapping and killed with ethyl acetate or 75% ethanol. Fresh specimens were kept in 75% ethanol before dissection. Habitus and external characters were taken using a Canon EOS 760D camera in conjunction with a Tamron 90 mm f/2.8 1:1 Macro Lens. Zerene Stacker (version 1.04) was used for stacking of the habitus images. Male aedeagi were photographed using a Keyence VHX-5000 digital microscope. All images were modified and arranged to plates in Adobe Photoshop CS5.

The distribution map was modified from a map downloaded from SimpleMapper (www.simplemapper.net). The dis-

tributional data were located based on the records of OHAUS (1914, 1916, 1932, 1936), ARROW (1917), BURGEON (1932), LIN (2002b), ZORN (2004), and materials examined herein.

Labels in Chinese language were translated into English for the convenience of the reader. Lines on the same label are separated by slashes (/), individual labels are separated by double slashes (//). Each number refers to a specimen. Continuous numbers are connected by an n-dash (–), discontinuous numbers are separated by a comma. Type series were provided with one printed label ‘HOLOTYPE [or] PARATYPE / *Anomala consanguinea* / det. Zhao, 2019’. Holotype label is in red, and the paratype labels are in yellow. Specimens were deposited in the following public and private collections (curators in parenthesis):

CCTC	Chang-Chin Chen’s collection, Tianjin, China;
CZGC	Carsten Zorn’s collection, Gnoien, Germany;
GEEP	Guangdong Eco-Engineering Polytechnic, Guangzhou, China (Shao-Bin Huang);
IZAS	Institute of Zoology, Chinese Academy of Sciences, Beijing, China (Ming Bai);
JZSC	Zhuo-Heng Jiang’s collection, Shanghai, China;
MSPC	Matthias Seidel’s collection, Praha, Czech Republic;
NMPC	National Museum, Praha, Czech Republic (Jiří Hájek);
SCAU	South China Agricultural University, Guangzhou, China (Ming-Yi Tian);
SYSM	The Museum of Biology, Sun Yat-sen University, Guangzhou, China (Hong Pang);
WFCC	Fa-Lei Wang’s collection, Chongqing, China;
ZMGC	Ming-Zhi Zhao’s collection, Guangzhou, China.



Taxonomy

Anomala consanguinea sp. nov.

(Figs 1A–F; 3A–C; 4A–C, G; 5A–C)

Type locality. China, Hainan Province, Ledong Li Autonomous County, Jianfeng Town, Jianfengling National Forest Park, Tianchi, 950m.

Type material (608 spec.). HOLOTYPE: ♂ (SCAU), 'China: Hainan, Ledong Li / Mount Jianfengling / 天池 [= Tianchi], 950m / 2009.IV.10 / Wen-Hsin Lin leg.' PARATYPES: CHINA: 2 ♂♂ (CCTC), 'China: Hainan, Ledong Li / Mount Jianfengling / Tianchi 天池 [= Tianchi], 950m / 2010.IV.21 / Wen-Hsin Lin leg.'; 1 ♂ (CCTC), 'China: Hainan, Ledong Li, / Mount Jianfengling, / Observation Tower, / 1000m, 2009.IV.26, / Wen-Hsin Lin leg.'; 2 ♂♂ 7 ♀♀ (ZMGC), 'China: Hainan, Ledong Li, / Mount Jianfengling, / Mingfenggu 鸣凤谷 [= Mingfenggu] / 2015.IV.23, Lu Qiu leg.'; 3 ♂♂ (CCTC), 'China: Hainan, / Mount Wuzhishan, 水满乡 [= Shuimanxiang Township] / 700m, 2010.IV.10, / Wen-Hsin Lin leg.'; 1 ♂ 1 ♀ (CCTC), 'China: Hainan, / Mount Wuzhishan, / 700m, 2011.IV.21, / Yi-Ting Chung leg.'; 1 ♂ (ZMGC), 'China: Hainan, Qiongzong County / Yinggeling Nature Reserve, / Yinggezui, 656m, 2011.IV.26, / Yi-Ting Chung leg.'; 1 ♂ 1 ♀ (ZMGC), 'China: Hainan, / Diaoluoshan Mt., / 2015.IV.16-18, / Lu Qiu leg.'; 4 ♂♂ 1 ♀ (IZAS), '海南琼中黎母山 [= Hainan, Qiongzong, Mount Limushan] / 七家村 [= Qijiacun Village] 645m / 2010.IV.3 / 中科院动物研究所 [= IZAS] // 19.17° N / 109.72° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948598, IOZ(E)1948600–IOZ(E)1948603'; 15 ♂♂ 5 ♀♀ (IZAS), '海南琼中黎母山 [= Hainan, Qiongzong, Mount Limushan] / 七家村 [= Qijiacun Village] 645m / 2010.IV.4 / 中科院动物研究所 [= IZAS] // 19.17° N / 109.72° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948073–IOZ(E)1948075, IOZ(E)1948077–IOZ(E)1948078, IOZ(E)1948080–IOZ(E)1948082, IOZ(E)1948086, IOZ(E)1948689–IOZ(E)1948690, IOZ(E)1948147–IOZ(E)1948151'; 1 ♂ 2 ♀♀ (IZAS), '海南琼中黎母山 [= Hainan, Qiongzong, Mount Limushan] / 七家村 [= Qijiacun Village] 647m / 2010.IV.6 / 中科院动物研究所 [= IZAS] // 19.17° N / 109.72° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948604, IOZ(E)1948607, IOZ(E)1948609'; 5 ♂♂ 3 ♀♀ (IZAS), '海南琼中黎母山 [= Hainan, Qiongzong, Mount Limushan] / 七家村 [= Qijiacun Village] 657m / 2010.IV.7 / 中科院动物研究所 [= IZAS] // 19.17° N / 109.71° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948083, IOZ(E)1948103–IOZ(E)1948106, IOZ(E)1948111, IOZ(E)1948113–IOZ(E)1948114'; 15 ♂♂ 16 ♀♀ (IZAS), '海南琼中黎母山 [= Hainan, Qiongzong, Mount Limushan] / 银河护林站 [= Yinghe Forestry Preserve Station] 641m / 2010.IV.5 / 中科院动物研究所 [= IZAS] // 19.18° N / 109.74° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948657–IOZ(E)1948687'; 1 ♂ (IZAS), '海南琼中黎母山 [= Hainan, Qiongzong, Mount Limushan] / 七家村 [= Qijiacun Village] 645m / 2010.IV.3 / 中科院动物研究所 [= IZAS] // 19.17° N / 109.72° E / 采集人: 张魁艳 [= Kui-Yan Zhang leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948112'; 2 ♀♀ (IZAS), '海南琼中黎母山 [= Hainan, Qiongzong, Mount Limushan] / 海拔: 640m / 2007.V.15 李娴 [= Xian Li leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1947920, IOZ(E)1947978'; 32 ♂♂ 5 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 海拔: 790m [= alt. 790m] / 2010.IV.13 / 中科院动物研究所 [= IZAS] // 18.97° N / 109.29° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948610, IOZ(E)1948613–IOZ(E)1948616, IOZ(E)1948619–IOZ(E)1948621, IOZ(E)1948044–IOZ(E)1948068, IOZ(E)1948070–IOZ(E)1948072, IOZ(E)1948087'; 28 ♂♂ 8 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 鹦哥嘴 [= Yinggezui] 627m / 2010.IV.17 / 中科院动物研究所 [= IZAS] // 19.05° N / 109.56° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1948611, IOZ(E)1948622–IOZ(E)1948656'; 14 ♂♂ 7 ♀♀ (IZAS), '海南省白沙鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 2011-V-1 灯诱 [= lighting trap] / 林文信 [= Wen-Hsin Lin leg.] 600m / 中国科学院动物研究所 [= IZAS] // IOZ(E)1948692–IOZ(E)1948696, IOZ(E)1948698–IOZ(E)1948706, IOZ(E)1948709–IOZ(E)1948715'; 1 ♂ (IZAS), '海南省白沙鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 2011-IV-27–30 / 600-780m 林文信 [= Wen-Hsin Lin leg.] / 中国科学院动物研究所 [= IZAS] // IOZ(E)1948708'; 4 ♂♂ 3 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 南开乡 [= Nankaixiang Township]

336m / 2010.IV.16 / 中科院动物所 [= IZAS] // 19.01° N / 109.36° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948108–IOZ(E)1948110, IOZ(E)1948116–IOZ(E)1948118'; 1 f* (IZAS), '海南白沙县鹦哥嘴 [= Hainan, Baisha County, Yinggezui] / 2009.V.6 灯诱 [= lighting trap] / 胡婷玉 [= Ting-Yu Hu leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947910'; 1 ♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 鹦哥嘴保护站 [= Yinggezui Station] 灯诱 [= lighting trap] / 2009.V.6 张睿 [= Rui Zhang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947911–IOZ(E)1947915'; 1 ♂ 3 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 红坝水库 [= Hongba Reservoir] 灯诱 [= lighting trap] / 2009.V.3 胡婷玉 [= Ting-Yu Hu leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947997'; 5 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 红坝水库 [= Hongba Reservoir] 灯诱 [= lighting trap] / 2009.V.4 胡婷玉 [= Ting-Yu Hu leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947911–IOZ(E)1947915'; 1 ♂ 3 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 红坝水库 [= Hongba Reservoir] 灯诱 [= lighting trap] / 2009.V.5 胡婷玉 [= Ting-Yu Hu leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947998, IOZ(E)1948000–IOZ(E)1948002'; 1 ♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 红坝水库 [= Hongba Reservoir] 灯诱 [= lighting trap] / 2009.V.4 张睿 [= Rui Zhang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948008'; 1 ♂ 2 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 红坝水库 [= Hongba Reservoir] 灯诱 [= lighting trap] / 2009.V.5 张睿 [= Rui Zhang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948007–IOZ(E)1948006, IOZ(E)1948011'; 2 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 红坝水库 [= Hongba Reservoir] 灯诱 [= lighting trap] / 2009.V.4 党利红 [= Li-Hong Dang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948005, IOZ(E)1948010'; 2 ♀♀ (IZAS), '海南白沙县鹦哥岭 [= Hainan, Baisha County, Yinggeling] / 红坝水库 [= Hongba Reservoir] 灯诱 [= lighting trap] / 2009.V.5 党利红 [= Li-Hong Dang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948003–IOZ(E)1948004'; 2 ♂♂ 3 ♀♀ (IZAS), '海南吊罗山顶 [= Hainan, top of Mount Diaoluoshan] / 海拔: 900m / 2007.V.3 肖晖 [= Hui Xiao leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947926, IOZ(E)1947930, IOZ(E)1947966, IOZ(E)1947979, IOZ(E)1947988'; 5 ♂♂ 1 ♀ (IZAS), '海南吊罗山 [= Hainan, top of Mount Diaoluoshan] / 海拔: 900m / 2007.V.4 肖晖 [= Hui Xiao leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947931, IOZ(E)1947940, IOZ(E)1947965, IOZ(E)1947967, IOZ(E)1947981, IOZ(E)1947989'; 2 ♂♂ 13 ♀♀ (IZAS), '海南吊罗山管理站 [= Hainan, Management Station of Mount Diaoluoshan] / 2007.V.5 肖晖 [= Hui Xiao leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947918, IOZ(E)1947927–IOZ(E)1947929, IOZ(E)1947932, IOZ(E)1947955, IOZ(E)1947959, IOZ(E)1947961, IOZ(E)1947963, IOZ(E)1947968, IOZ(E)1947983, IOZ(E)1947987, IOZ(E)1947990, IOZ(E)1947993–IOZ(E)1947994'; 3 ♂♂ 1 ♀ (IZAS), '海南吊罗山渡假村 [= Hainan, Mount Diaoluoshan, Vocational Village] / 海拔: 920m / 2007.V.4 / 中科院动物所 [= IZAS] // 18.39° N / 108.53° E / 张彦周 [= Yan-Zhou Zhang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947936–IOZ(E)1947937, IOZ(E)1947969, IOZ(E)1947980'; 2 ♂♂ 14 ♀♀ (IZAS), '海南吊罗山 [= Hainan, Mount Diaoluoshan] / 海拔: 260m / 2007.V.4-5 / 中科院动物所 [= IZAS] // 18.39° N / 108.53° E / 张彦周 [= Yan-Zhou Zhang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947933–IOZ(E)1947934, IOZ(E)1947938, IOZ(E)1947954, IOZ(E)1947956–IOZ(E)1947958, IOZ(E)1947960, IOZ(E)1947971, IOZ(E)1947974–IOZ(E)1947977, IOZ(E)1947991, IOZ(E)1947995, IOZ(E)1947999'; 8 ♂♂ 13 ♀♀ (IZAS), '海南五指山 [= Hainan, Mount Wuzhishan] / 海拔: 730-900m / 2007.V.8-13 / 中科院动物研究所 [= IZAS] // 18.54° N / 109.40° E / 采集人: 肖晖 韩红 香 郎嵩云 [= Xiao Hui, Hong-Xiang Han & Song-Yun Lang leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948606, IOZ(E)1947939, IOZ(E)1947941–IOZ(E)1947947, IOZ(E)1947950–IOZ(E)1947953, IOZ(E)1947964, IOZ(E)1947970, IOZ(E)1947972–IOZ(E)1947973, IOZ(E)1947982, IOZ(E)1947984–IOZ(E)1947986'; 1 ♀ (IZAS), '海南五指山水满乡 [= Hainan, Mount Wuzhishan, Shuimanxiang Township] / 度假寨 [= vocational village] 730m 灯诱 [= lighting trap] / 2007.V.9 / 中科院动物研究所 [= IZAS] // 18.54° N / 109.40° E / 李娴 [= Xian Li leg.] / 中科院动物所 [= IZAS] // IOZ(E)1947948'; 2 ♀♀ (IZAS), '海南五指山水满乡 [= Hainan, Mount Wuzhishan, Shuimanxiang Township] / 2007.V.8 李娴 [= Xian Li leg.] / 中科院动物研究所 [= IZAS] // IOZ(E)1947921, IOZ(E)1947949'; 5 ♂♂ 18 ♀♀ (IZAS), '海南五指山 [= Hainan, Mount Wuzhishan] / 920m 2007.V.8 / 李娴 [= Xian Li

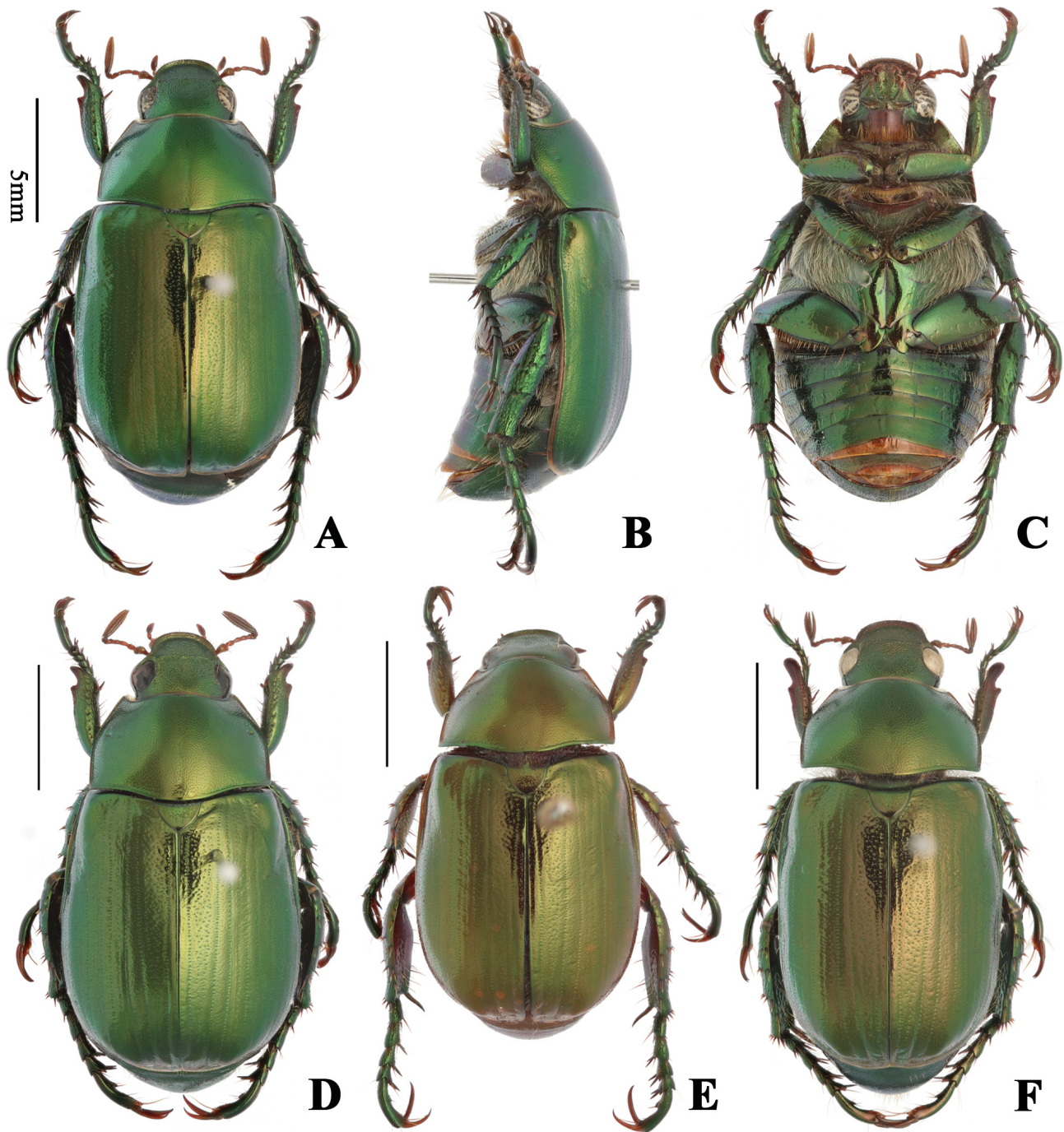


Fig. 1. Habitus of *Anomala consanguinea* sp. nov. A–C – holotype; D – paratype ♂ (Guangdong, China); E – paratype ♂ (Hainan, China); F – paratype ♀ (Hainan, China). A, D–F – dorsal view; B – lateral view; C – ventral view. Scale = 5 mm.

leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948012–IOZ(E)1948031, IOZ(E)1948033, IOZ(E)1948605, IOZ(E)1948688'; 5 ♂♂ 1 ♀ (IZAS), '海南五指山门口 [= Hainan, gate of Mount Wuzhishan] / 海拔: 708m / 2010.IV.8 / 中科院动物所 [= IZAS] // 18.90° N / 109.67° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948094, IOZ(E)1948095, IOZ(E)1948097, IOZ(E)1948098, IOZ(E)1948099, IOZ(E)1948101'; 8 ♂♂ 1 ♀ (IZAS), '海南五指山保护区 [= Hainan, Mount Wuzhishan Nature Reserve] / 海拔: 708m / 2010.IV.9 / 中科院动物所 [= IZAS] // 18.90° N / 109.67° E / 采集人: 林美英 [= Mei-Ying Lin leg.] / 中科院动物所 [= IZAS] // IOZ(E)1948084–IOZ(E)1948085, IOZ(E)1948088–IOZ(E)1948093, IOZ(E)1948100'; 12 ♂♂ 25 ♀♀ (IZAS), '海南五指山保护站 [= Hainan, Mount Wuzhishan] / 海拔: 708m / 2010.IV.11 / 中科院动物研究所 [= IZAS] // 18.90° N / 109.67° E / 采集人: 林美英 [= Mei-Ying Lin leg.]

/ 中科院动物所 [= IZAS] // IOZ(E)1948032, IOZ(E)1948036–IOZ(E)1948043, IOZ(E)1948119–IOZ(E)1948146'; 4 ♂♂ (IZAS), '海南昌江县霸王岭 [= Hainan, Changjiang County, Mount Bawangling] / 东二保护站 [= Dong'er Station] 825m / 2007.V.9 / 中科院动物所 [= IZAS] // N 19°12' / E 109°10' / 梁宏斌 肖晖 [= Hong-Bin Liang & Hui Xiao leg.] / 中科院动物所 [= IZAS] // IOZ(E)1946843–IOZ(E)1946844, IOZ(E)1946847–IOZ(E)1946848'; 5 ♂♂ 6 ♀♀ (IZAS), '海南尖峰岭天池 [= Hainan, Mount Jianfengling, Tianchi] / 海拔: 675m / 2007.V.1-5 / 中科院动物所 [= IZAS] // N 18°71' / E 108°87' / 梁宏斌 肖晖 [= Hong-Bin Liang & Hui Xiao leg.] / 中科院动物所 [= IZAS] // IOZ(E)1946845–IOZ(E)1946846, IOZ(E)1946849–IOZ(E)1946857'; 1 ♂ (ZMGC), '海南省五指山亚泰雨林酒店 [= Hainan Prov., Wuzhishan, Yatai Rainforest Hotel] / N18.907457° E109.676927° / 720m, 2019.IV.8 周润 [= Run Zhou leg.] / 中科院动物所 [= IZAS] // Ex. coll. IZCAS';

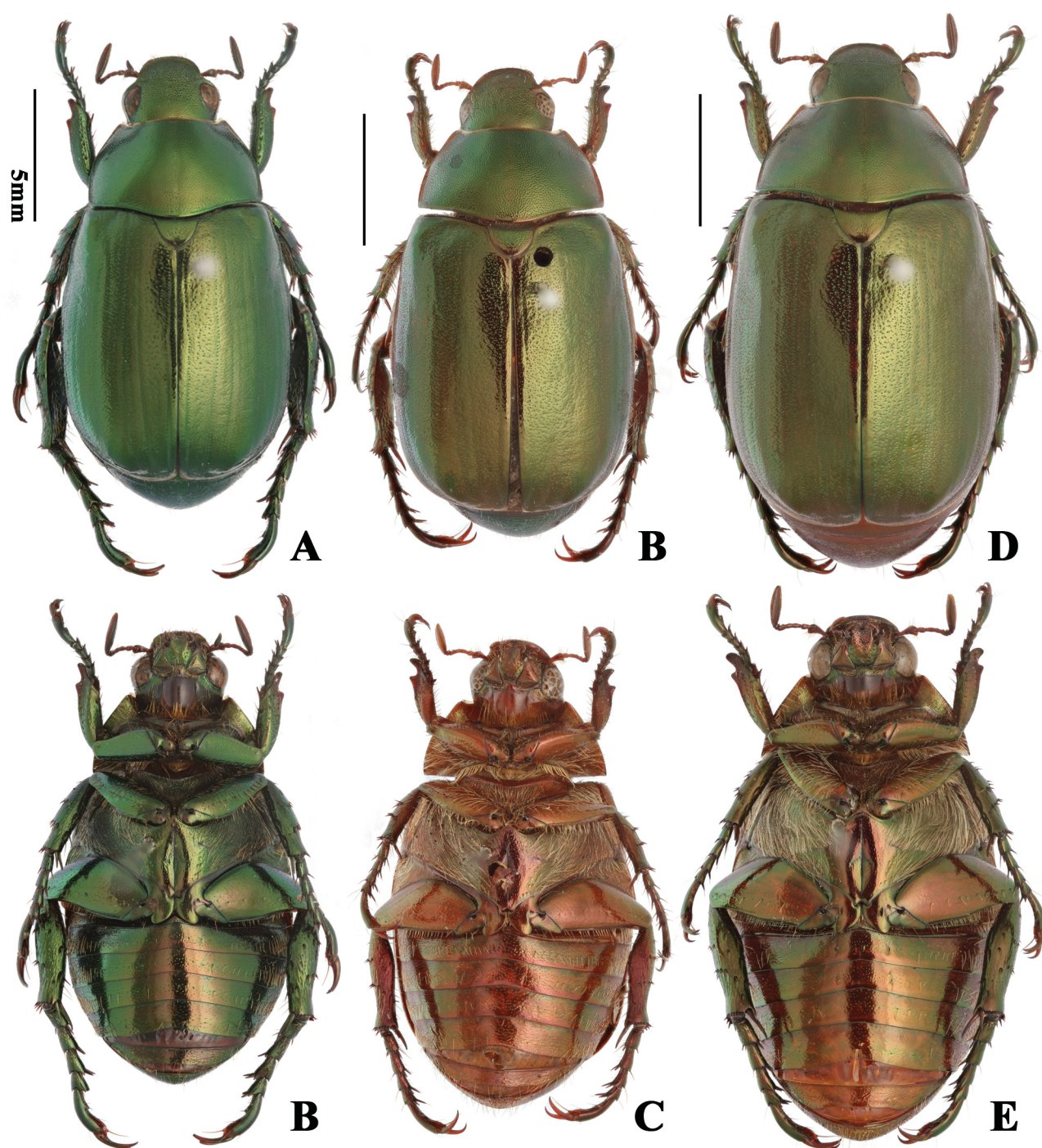


Fig. 2. Habitus of *Anomala* spp., male. A–B – *A. esmeralda* Prokofiev, 2013 (Quảng Nam, Vietnam); C–D – *A. russiventris* Fairmaire, 1893 (Guangdong, China); E–F – *A. inepta* Ohaus, 1916 (Sabah, Malaysia). A, C, E – dorsal view; B, D, F – ventral view. Scale = 5 mm.

1 ♂ 1 ♀ (ZMGC), ‘海南白沙鹦哥岭公路边 [= Hainan, Baisha, Yinggeling, roadside] / 109°34'6.88"E 19°2'43.59"N / 王兴民 佟俊博 梁建锋 [= Xing-Min Wang, Jun-Bo Tong & Jian-Feng Liang leg.] / 2019.IV.14 589m 灯诱法 [= light trap]’; 1 ♂ (ZMGC), ‘海南白沙鹦哥岭公路边 [= Hainan, Baisha, Yinggeling, roadside] / 109°34'6.88"E 19°2'43.59"N / 王兴民 佟俊博 梁建锋 [= Xing-Min Wang, Jun-Bo Tong & Jian-Feng Liang leg.] / 2019.IV.13 589m 灯诱法 [= light trap]’; 1 ♂ 3 ♀♀ (1 ♂ 2 ♀♀ in NMPC, 1 ♀ in CZGC), ‘CHINA, HAINAN Isl., 4-6.v.2011 / Limushan Mts. / frst administer. centre (at light) / 19°10'30"N, 109°44'33"E, 630m / M. Fikáček, V. Kubeček & L. Li leg.’; 3 ♂♂ (NMPC), ‘CHINA, HAINAN Isl., 7-8.v.2011 / Bawangling Mts. / BAOTIE env. (at light) / 19°05.3'N, 109°07.4'E; 415-800 m / M. Fikáček, V. Kubeček & L. Li leg.’; 6 ♂♂ (CZGC), ‘China, HAYNAN’

Isl. / Wuzhi Shan Mts., / 18°53'N-109°43'E, / 20.02-10.04.2001 / 1500m. Loc. Coll. lg.’; 1 ♀ (JZSC), ‘China: Hainan, Wuzhishan / alt. 930m, 18°54'09"N / 109°41'18"E, 8-11.VI.2017, / 8-11.VI.2017, / Jiang, Ge leg.’; 3 ♂♂ (WFCC), ‘2019.IV.12-14 / 海南五指山 [= Hainan, Mount Wuzhishan] / 1200m / 邱见玥采 [= Jian-Yue Qiu leg.]’; 1 ♂ (ZMGC), ‘广东惠州象头山 [= Guangdong Province, Huizhou City, Mount Xi-angtoushan] / 2015.III.26-27, / 叶昕海采 [= Xin-Hai Ye leg.]’; 1 ♂ (GEEP), ‘Guangdong’; 81 ♂♂ 120 ♀♀ (62 ♂♂ 79 ♀♀ in ZMGC, 5 ♂♂ 15 ♀♀ in SCAU, 10 ♂♂ 20 ♀♀ in IZAS, 3 ♂♂ 5 ♀♀ in WFPC, 1 ♂ 1 ♀ in MSPC), ‘CHINA: Guangdong Prov., / Maoming City, Xintian Town, / N 21°42'26.16" E 111°17'3.28" / light trap, Qiang GAN leg.’; 5 ♂♂ (CZGC), ‘CHINA: Hainan Prov., Ledong, / Mts. Jianfengling, alt. 716m, / 18.710708 N 108.875812 E / 2019.IV, Shi-Liang Mo leg.’.

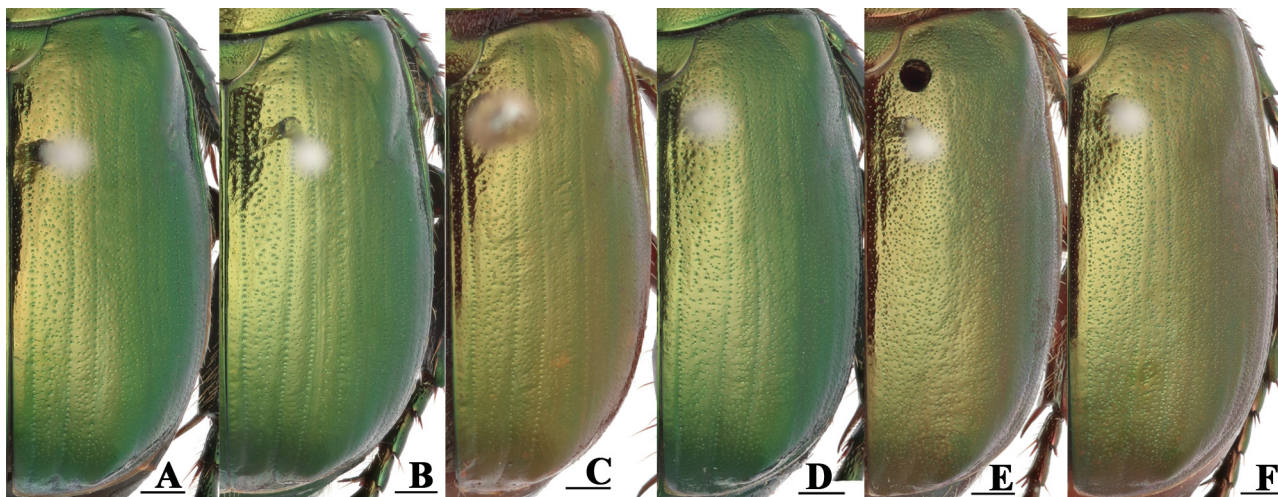


Fig. 3. Elytra of *Anomala* spp., male. A – *A. consanguinea* sp. nov., holotype; B – ditto, paratype (Guangdong, China); C – ditto, paratype (Hainan, China); D – *A. esmeralda* Prokofiev, 2013 (Quảng Nam, Vietnam); E – *A. russiventris* Fairmaire, 1893 (Guangdong, China); F – *A. inepta* Ohaus, 1916 (Sabah, Malaysia). Scale = 1 mm.



Fig. 4. Protarsi and protibial teeth of *Anomala* spp. A – *A. consanguinea* sp. nov.; holotype; B – ditto, paratype ♂ (Guangdong, China); C – ditto, paratype ♂ (Hainan, China); D – *A. esmeralda* Prokofiev, 2013 ♂ (Quảng Nam, Vietnam); E – *Anomala russiventris* Fairmaire, 1893 ♂ (Guangdong, China); F – *A. inepta* Ohaus, 1916 ♂ (Sabah, Malaysia); G – *A. consanguinea*, paratype ♀ (Hainan, China). Scale = 1 mm.

Description. Male (holotype). Body shape elongate ovoid, convex. Total length 18.0 mm, maximum width 9.1 mm.

Colour. Dorsal and ventral surfaces blackish-brown, with green metallic luster and coppery tinge; antennae, claws, teeth of protibia, margins of pronotum, and apex of scutellum reddish-brown.

Head. Clypeus semicircular, approximately 2.81 times wider than long, anterior margin reflexed, disc densely rugopunctate; frons densely punctate, each side with several larger punctures along eye, each of these large punctures with long seta; vertex finely punctate; ratio of interocular width/width of head approximately 0.67; antennal club slightly longer than antennomeres II–VI combined.

Pronotum approximately 1.57 times wider than long; with smooth median longitudinal line, each side with depression; anterior angles acute and produced, posterior angles obtuse; sides almost straight and weakly converging anteriorly in posterior three fifths, then fairly converging anteriorly in anterior two fifths; basal marginal line interrupted before scutellum, all other marginal lines complete; surface

densely and finely punctate; with several fine erect setae along lateral margins.

Scutellar shield. Sides rounded, apex acute; disc with sparse minute punctures.

Elytra (Fig 3A) regularly striate, stria punctures distinct; inner primary striae slightly impressed; subsutural interstice with two secondary striae, which unite towards apex, punctures irregularly doubled; whole surface moderately densely and finely punctate, punctures somewhat coalescent posterior to humerus; membranous apical border extending anteriorly to level of front of metacoxa; epipleura with longitudinal row of short erect setae extending posteriorly from level of metacoxa to level of abdominal ventrite III.

Legs. Protibia (Fig. 4A) approximately 3.5 times longer than wide; bidentate, proximal tooth blunt, apical tooth acute, extending to protarsomere II; protarsomere V ventrally with strong internomedial protruberance in middle; inner protarsal and outer mesotarsal claws incised apically, forming two branches; upper branches

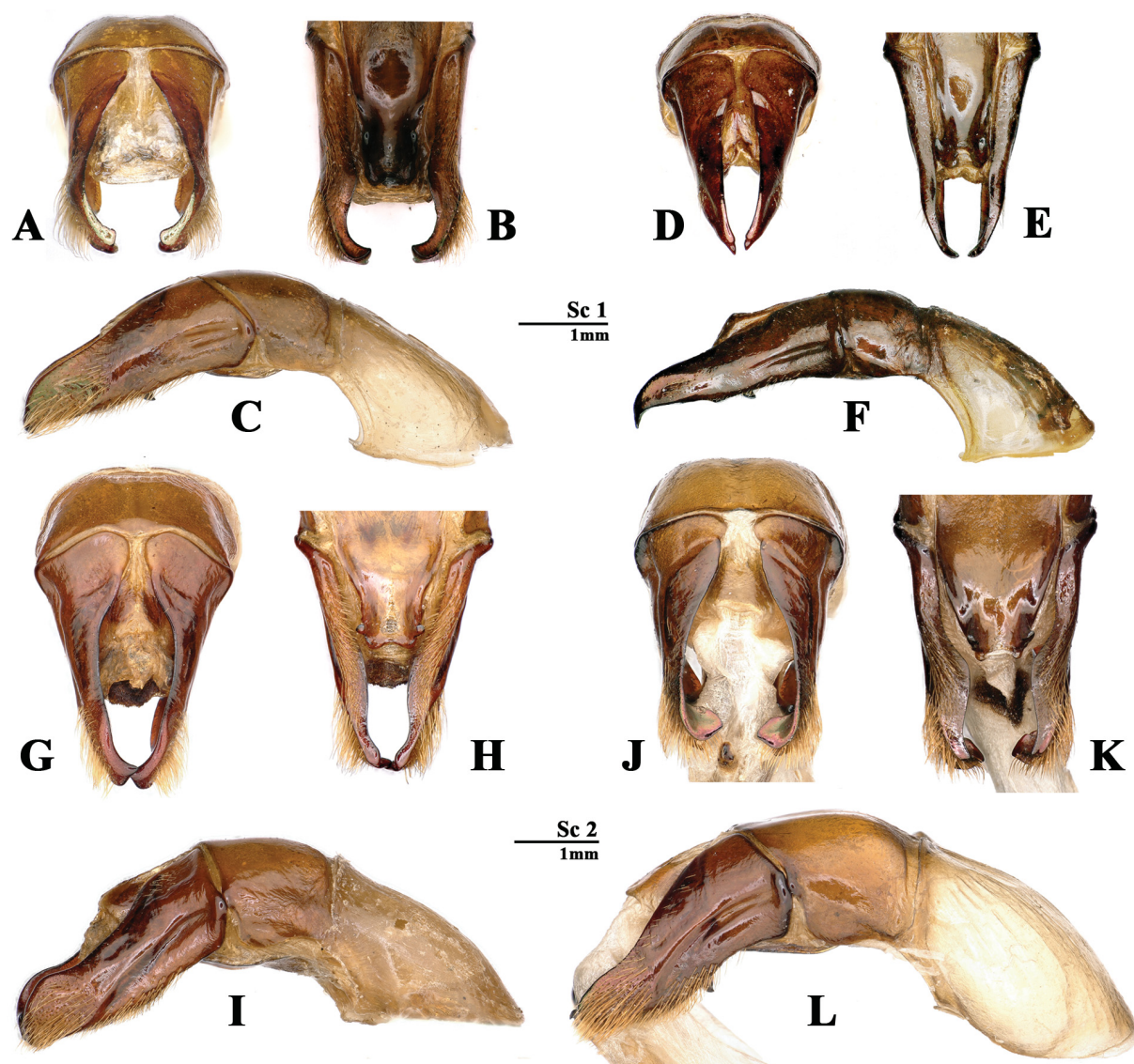


Fig. 5. Aedeagi of *Anomala* spp. A–C – *A. consanguinea* sp. nov., holotype; D–F – *A. esmeralda* Prokofiev, 2013 (Quảng Nam, Vietnam); G–K – *Anomala russiventris* Fairmaire, 1893 (Guangdong, China); I–L – *A. inepta* Ohaus, 1916 (Sabah, Malaysia). A, D, G, J – frontal view; B, E, H, K – ventral view; C, F, I, L – lateral view. Sc 1: Scale = 1 mm for A–F; Sc 2: Scale = 1 mm for G–L.

short, sharp at apex; lower branch of inner protarsal claw enlarged, sharp at apex; lower branch of outer mesotarsal claw slender, sharp at apex. Metatibia fusiform. Femora with transverse rows of moderately long erect setae; setae denser and longer on mesofemur.

Abdomen. Propygidium transversely striolate, striolation interrupted near pygidium. Pygidium triangular and moderately convex; rugostriolate, striolation denser on disc; sparsely surrounded by moderately long or long erect setae, setae denser on apex.

Ventral surface. Ventral prothoracic surface rugopunctate, bearing sparse long erect setae; ventral mesothoracic surface rugoso-punctate anteriorly, with irregular large punctures posteriorly, bearing dense short pubescence; metathoracic surface rugopunctate, bearing dense long pubescence, shallowly and sparsely punctate in middle. Abdominal ventrites I–IV carinate laterally; finely punctate, sides densely rugopunctate; with transverse band of sparse, long and semi-erect setae on posterior half (broadly interrupted in middle), dense and doubled laterad.

Male genitalia (Figs 5A–C). Parameres symmetrical, evenly curved inward sub-apically and pilose laterally, apices truncated and weakly emarginate (Fig. 3).

Female. Protibia (Fig. 4G) reddish-brown; legs slenderer and shorter than in male, especially protarsus; apical tooth of protibia long, tongue-shaped, extending to protarsomere III; protarsomere V with indistinct internomedial protuberance; lower branch of inner protarsal claw thinner than in male; antennal club approximately as long as antennomeres II–VI combined.

Variation. Total body length and greatest width 14.5–18.7 mm and 7.3–9.1 mm (males), 17.4–18.4 mm and 8.7–9.9 mm (females), respectively. Body colour sometimes strongly coppery or reddish-brown. Ratio of pronotal width/length ranges from ca. 1.48 to 1.56. Punctures vary in size, those of inner primary and secondary striae sometimes more annulate, in extreme cases ca. 1.5 times wider than in the holotype. Some male specimens with shortened or abraded apical tooth of protibia (Fig. 4C), only extending to front of protarsomere I.

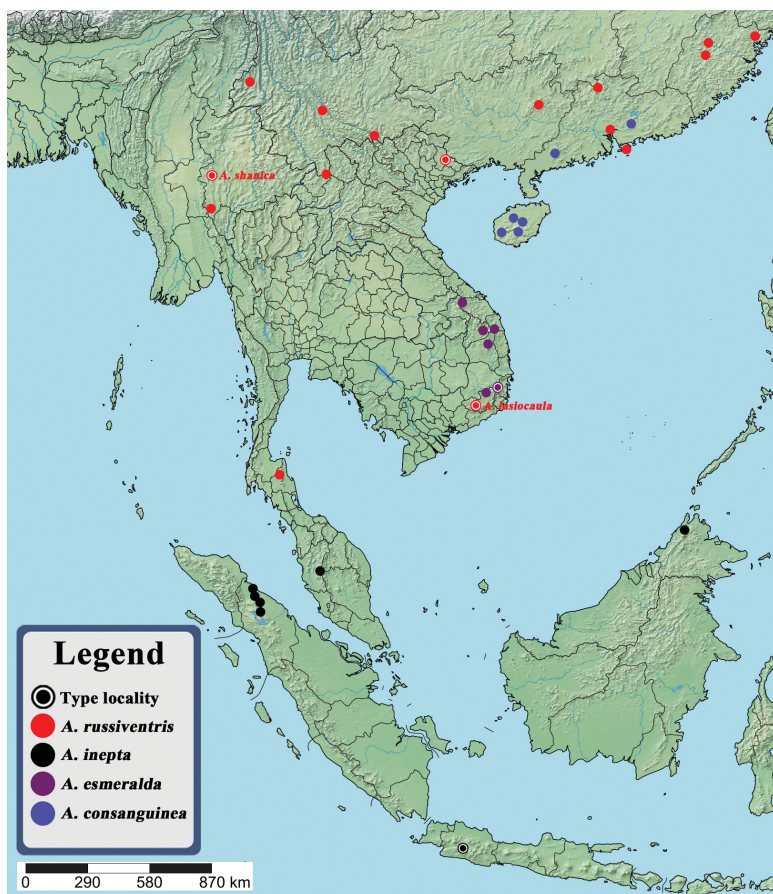


Fig. 6. Sketch map of Southeast Asia with marked distribution of *Anomala consanguinea* sp. nov. and its related species (inaccurate or questionable records were avoided).

Differential diagnosis. *Anomala consanguinea* sp. nov. is closely allied to *A. esmeralda* Prokofiev, 2013 (central to southern Vietnam), *A. russiventris* Fairmaire, 1893 (major part of mainland Southeast Asia and southern China), and *A. inepta* Ohaus, 1916 (Malay Archipelago). These four species share a very similar general habitus and very similar male parameres with distinctly pilose sides. *Anomala russiventris* and *A. inepta* may be conspecific and represent a very widespread species (C. Zorn, pers. comm. 2018). The new species differs from *A. esmeralda* in having distinctly thicker protarsal claws and protarsomeres (Figs 4A–C). The apical tooth of protibia usually extends to front of protarsomere 2 in male and protarsomere 3 in female (slightly extending beyond the front of protarsomere 1 in male and protarsomere 2 in female in *A. esmeralda*). Moreover, the parameres are strongly curved inward subapically and truncated apically (Figs 5A–C) (weakly curved inward subapically and acute apically in *A. esmeralda*, Figs 5D–F). *Anomala consanguinea* sp. nov. can be distinguished from *A. russiventris* and *A. inepta* by sparser irregular punctures of elytra (moderately dense in *A. consanguinea*, Figs 3A–C, dense to very dense in *A. russiventris* and *A. inepta*, Figs 3E–F), impressed inner primary striae of elytra (not impressed in *A. russiventris* and *A. inepta*) and less wide pronotum (ca. 1.48 to 1.56 times wider than long in *A. consanguinea*, ca. 1.65 to 1.73 times wider than long in *A. russiventris* and *A. inepta*). While most specimens of *A. russiventris* and *A. inepta* can be easily distinguished from *A. consanguinea* by brown ventral side, some *A. russiventris* specimens show the same dark metallic green color as found in the new species.

Etymology. The specific epithet is derived from the Latin adjective *consanguineus*, -a, -um (= related by blood), referring to the close relation between the new species and *A. esmeralda*.

Distribution. China (Hainan, Guangdong).

Species studied for comparative purposes

Anomala esmeralda Prokofiev, 2013

(Figs 2A–B, 3D, 4D, 5D–F)

Anomala esmeralda Prokofiev, 2013: 101 (original description); ZORN et al. (2017): 341 (collecting record).

Type locality. ‘Vietnam, Khanh Hoa prov., Khanh Vinh distr., DT 652, 12°13.55'N, 108°46.02'E, alt. 877–879m.’

Material examined (3 spec.). 1 ♂ 2 ♀♀ (ZMGC), Mt. Axan, Tay Giang, Quang Nam Province, Vietnam, ca. N 15°49'04" E 107°18'12", alt. 1200m, viii.2017, local collector leg.

Notes. The examined material presents a new record for Vietnam (Quảng Nam Province), which documents the northernmost known distribution of this species.

Distribution. Vietnam (Khánh Hoa, Lâm Đồng, Gia Lai, Kon Tum, Quảng Nam).

Anomala russiventris Fairmaire, 1893

(Figs 2C–D, 3E, 4E, 5G–I)

Anomala russiventris Fairmaire, 1893: 290 (original description); PAULIAN (1959): 65 (redescription and key, parameres figured, “Groupe *sinica*”); MACHATSCHKE (1972): 113 (catalogue, “*rufipes*-Gruppe”); LIN (2002a): 348 (key); LIN (2002b): 404 (redescription); ZORN (2004): 312 (taxonomic revision); ZORN (2006): 263 (catalogue); PROKOFIEV (2013): 102 (in diagnosis of *Anomala esmeralda*, parameres of syntype figured); ZORN & BEZDĚK (2016): 338 (catalogue).

Anomala lasiocaula Ohaus, 1914: 212 (original description, parameres figured); OHAUS (1932): 132 (collecting record); PAULIAN (1959): 65 (redescription and key, parameres figured, “Groupe *sinica*”); MACHATSCHKE (1972): 113 (catalogue, “*rufipes*-Gruppe”); ZORN (2004): 312 (junior synonym of *A. russiventris*); ZORN (2006): 263 (catalogue, in synonymy); ZORN & BEZDĚK (2016): 338 (catalogue, in synonymy).

Anomala shanica Arrow, 1917: 218 (original description, parameres figured); MACHATSCHKE (1972): 113 (catalogue, “*rufipes*-Gruppe”); LIN (1982): 36 (junior synonym of *A. russiventris*); ZORN (2004): 312 (in synonymy); ZORN (2006): 263 (catalogue, in synonymy); ZORN & BEZDĚK (2016): 338 (catalogue, in synonymy).

Anomala lasiocaula Ohaus, 1926 [sic!]; LIN (2002a): 348 (key).

Type locality. ‘Lang-Song. [Lang Son, Vietnam.]’; type locality of *Anomala lasiocaula*: ‘Haut-Tonkin, Bao-Lac. [Bao Loc, Lâm Đồng, Vietnam.]’; type localities of *Anomala shanica*: ‘Burma, S. Shan States, Kolaw, 4000 ft. [Kalaw, Shan State, Myanmar.]’, ‘Burma, S. Shan States, Karen Hills.’.

Material examined (25 spec). 3 ♂♂ 13 ♀♀ (ZMGC), CHINA: Guangdong Prov., Guangzhou City, Wangzishan Forest Park, N 23°34'24" E 113°12'44", 2019.V.1~2, Jia-Ming Lu & Xiao-Han Ye leg.; 1 ♂ (SCAU), Guangdong Prov., Shaoguan City, Nanling Natural Reserve, 2011.V.18-21; 1 ♂ (CCTC), CHINA, Guangxi, Jinxiu, Dayaoshan, Gubaotun 700m, 2018, V-13, J.-T. Zhao leg.; 1 ♂ (CCTC), CHINA, Yunnan, Mengla, Mohan, 1100m, 2018, V-13~18, Leg. C.-C. Chen; 1 ♂ 1 ♀ (ZMGC), CHINA: Yunnan Prov., Honghe Pref., Daweishan, Malutang, 2017.VI.6, Zhi-Wei Dong leg.; 1 ♂ 1 ♀ (ZMGC), CHINA: Yunnan Prov., Xiping County, Mount Ailaoshan, 2016.V.11~13, Lu Qiu leg.; 1 ♂ (ZMGC), CHINA: Yunnan Prov., Baoshan City, Gaoligong Mts., Baihualing, 2016.V., Zhi-Wei Dong leg.; 1 ♂ (SYSM), HONG-LOK-YUEN TAI-PO.N.T. HONG KONG IV-22-1941 / *Anomala russiventris*? Fairm. det. P. Lin 1975 / En-015084.

Notes. LIN (2002a) reported both *Anomala russiventris* and *A. lasiocaula* from Hainan Province, the two species were later synonymized by ZORN (2004). Neither the material studied by Lin nor any additional specimens from Hainan were available to the author, thus these records remain questionable. This species also occurs in Laos and western Malaysia (C. Zorn, pers. comm., 2018); however, the exact locality is unknown and thus omitted in the distribution map.

Distribution. Vietnam (Lang Son, Lâm Đồng, “Annam”); China (Fujian, Guangdong, Guizhou, Guangxi, Yunnan, Hongkong, Hainan?); Thailand (Nakhon Si Thammarat); Cambodia (unspecific and omitted in the map); Myanmar (Shan); Laos (see above); Malaysia (see above).

Anomala inepta Ohaus, 1916

(Figs 2E–F, 3F, 4F, 5J–L)

Anomala inepta Ohaus, 1916: 69 (original description, parameres figured); BURGEON (1932): 75 (collecting record); OHAUS (1936): 354 (collecting record); MACHATSCHKE (1972): 119 (catalogue, “*cuprascens*-Gruppe”).

Type locality. ‘W. Java, Pengalengan, 4000 ft. [Pengalengan District, Bandung Regency, West Java, Indonesia.]’

Material examined (4 spec.). 1 ♂ (ZMGC), Mt. Kinabalu, Sabah, Malaysia, 2018.V.4~7, Zhi-Wei Dong leg.; 1 ♀ (NMPC), Madan, Sumatra, coll. Hayek / WSD00344395; 1 ♂ (MSPC), North Sumatra, Brasstagi, 76km S of Medan, 30.iii.-01.iv.1996, S. Becvar leg. / WSD00341816; 1 ♂ (MSPC), Malaysia, Tanah Rata, Cameron Highlands, 10.iv.1976, S. Saita leg. / WSD00344428.

Distribution. Indonesia (Java, Sumatra); first record from Malaysia (Sabah).

Discussion

Four species from the Oriental Region and southern China, *A. consanguinea* sp. nov., *A. esmeralda*, *A. inepta*, and *A. russiventris* exhibit high resemblances in both external features and general structure of male genitalia. Their aedeagi are simple and symmetric, with the apices of parameres bend ventrad in lateral view. The strongly pilose parameres are very peculiar and rare among *Anomala* species, but can be found in other species groups with a different arrangement of the setae. This synapomorphy suggests that the mentioned four species form a natural group, although *Anomala russiventris* and *A. inepta* were placed into the ‘*rufipes*-group’ and the ‘*cuprascens*-group’ respectively by MACHATSCHKE (1972).

Acknowledgments

I wish to express my gratitude to Carsten Zorn (Gnoien, Germany) and Yuan-Yuan Lu (IZAS) for critically reviewing my manuscript and providing valuable comments to the early version of my manuscript; Ming-Yi Tian (SCAU) for equipment support and his continuous encouragement; Chang-Chin Chen (Tianjin, China), Lu Qiu (Southwest University, China), Zhi-Wei Dong (Kunming Institute of Zoology, China), Jiří Hájek, Matthias Seidel (both NMPC), Bing-Lan Zhang (SYSU), Shao-Bin Huang (GEEP), Fa-Lei Wang (Chongqing, China) and Zhuo-Heng Jiang (Shanghai Normal University, China) for providing the access to the material; Ji-Shen Wang (Northwest A&F University, China) for preliminary language correction.

References

- ARROW G. J. 1917: *The fauna of British India, including Ceylon and Burma. Coleoptera Lamellicornia part II (Rutelinae, Desmonycinae, and Euchirinae)*. Taylor & Francis, London, 387 pp.
- BURGEON L. 1932: Résultats scientifiques du voyage aux Indes orientales néerlandaises du LL.AA.RR. le Prince et la Princess Léopold de Belgique. Coleoptera, Rutelidae. *Mémoires du Musée d'Histoire Naturelle de Belgique, Hors Série* 4(4): 75–82.
- KRAJČÍK M. 2007: Checklist of the Scarabaeoidea of the World. 2. Rutelinae (Coleoptera: Scarabaeidae: Rutelinae). *Animma.x Supplementum* 4: 1–139.
- LIN P. 2002a: Coleoptera: Rutelidae. Pp. 345–355. In: HUANG F. S. (ed.): *Forest Insects of Hainan*. Science Press, Beijing, 1064 pp (in Chinese and English).
- LIN P. 2002b: Rutelidae. Pp. 387–427. In: HUANG B. K. (ed.): *Fauna of Insects in Fujian Province of China, Vol. 6*. Fujian Science and Technology Press, Fuzhou, 894 pp (in Chinese and English).
- MACHATSCHKE J. W. 1972: *Coleopterorum catalogus supplementa pars 66, fascicle 1, Superfamilie Scarabaeoidea, Familie Melolonthidae, Subfamilie Rutelinae. (Editio Secunda)*. Dr. W. Junk, s'-Gravenhage, Berlin, 361 pp.
- OHAUS F. 1914: XV. Beitrag zur Kenntnis der Ruteliden. *Stettiner Entomologische Zeitung* 75: 193–217.
- OHAUS F. 1916: XVIII. Beitrag zur Kenntnis der Ruteliden. *Stettiner Entomologische Zeitung* 77: 39–113.
- OHAUS F. 1932: Malay Rutelinae in the collection of the Federal Malay States Museums. *Journal of the Federated Malay States Museums* 17: 130–143.
- OHAUS F. 1936: Verzeichnis einer Sammlung Rutelinae des Buitenzorger Museums. *Treubia* 15: 353–361.

- PAULIAN R. 1959: Coléoptères scarabéides de l'Indochine (rutélines et cétonines). *Annales de la Société Entomologique de France* **128**: 35–136.
- PROKOFIEV A. M. 2013: New *Anomala* species from Vietnam. *Russian Entomological Journal* **22**: 97–109.
- PROKOFIEV A. M. 2015: New *Anomala* Samouelle, 1819 from South-East Asia. *Russian Entomological Journal* **24**: 37–59.
- ZHANG B. S. & LIN P. 2008: The *Anomala sinica* species group from China (Coleoptera: Rutelidae). *Oriental Insects* **42**: 125–141.
- ZORN C. 2004: Taxonomical acts in the Anomalini initiated during the preparation of the “Catalogue of Palaearctic Coleoptera”. *Acta Societatis Zoologicae Bohemicae* **68**: 301–328.
- ZORN C. 2006: Subfamily Rutelinae, tribe Anomalini C. E. Blanchard, 1851. Pp. 276–277. In: LÖBL I. & SMETANA A. (eds): *Catalogue of Palaearctic Coleoptera, Volume 3, Scarabaeoidea – Scirtoidea – Dascilloidea – Buprestoidea – Byrrhoidea*. Apollo Books, Stenstrup, 690 pp.
- ZORN C. 2011: New species of the genus *Anomala* Samouelle from mainland South East Asia and South China. *Stuttgarter Beiträge zur Naturkunde A, Neue Serie* **4**: 297–312.
- ZORN C. & BEZDĚK A. 2016: Subfamily Rutelinae. Pp. 317–358. In: LÖBL I. & LÖBL D. (eds): *Catalogue of Palaearctic Coleoptera, Volume 3, Scarabaeoidea, Scirtoidea, Dascilloidea, Buprestoidea, Byrrhoidea. Revised and updated edition*. Brill, Leiden, 983 pp.
- ZORN C., KOBAYASHI H. & WADA K. 2017: Notes on the genus *Anomala* Samouelle, 1819 (Coleoptera, Scarabaeidae, Rutelinae) in Vietnam and neighboring regions: eight new species and faunistic records. *Beiträge zur Entomologie* **67**: 325–352.