

## Male Genitalic Features of *Platycerus ladyae* (Coleoptera, Lucanidae) and Records of Two Least Known Species of the Same Genus from Sichuan, Southwest China

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**Abstract** Male genitalic features including those of the internal sac of *Platycerus ladyae* are figured and described for the first time. Two other species of the same genus, *P. dundai* and *P. hiurai* are recorded from new localities in central Sichuan.

In the first half of this paper, I will describe detailed morphological findings of the male genitalia of *Platycerus ladyae* IMURA, 2005. The basal piece, paramere and penis of this species were figured and described in other papers of mine (IMURA, 2005, 2010), but findings of fully inflated internal sac have not yet been introduced into science. In the second half, two least known species of the same genus, *P. dundai* and *P. hiurai* will be recorded from new localities in central Sichuan. All the specimens examined in this study were collected through my field researches routinely made in recent years in collaboration with the Academia Sinica. Terms and abbreviations for the genital organs employed herein are the same as those used in my previous paper (IMURA, 2010, pp. 9–11).

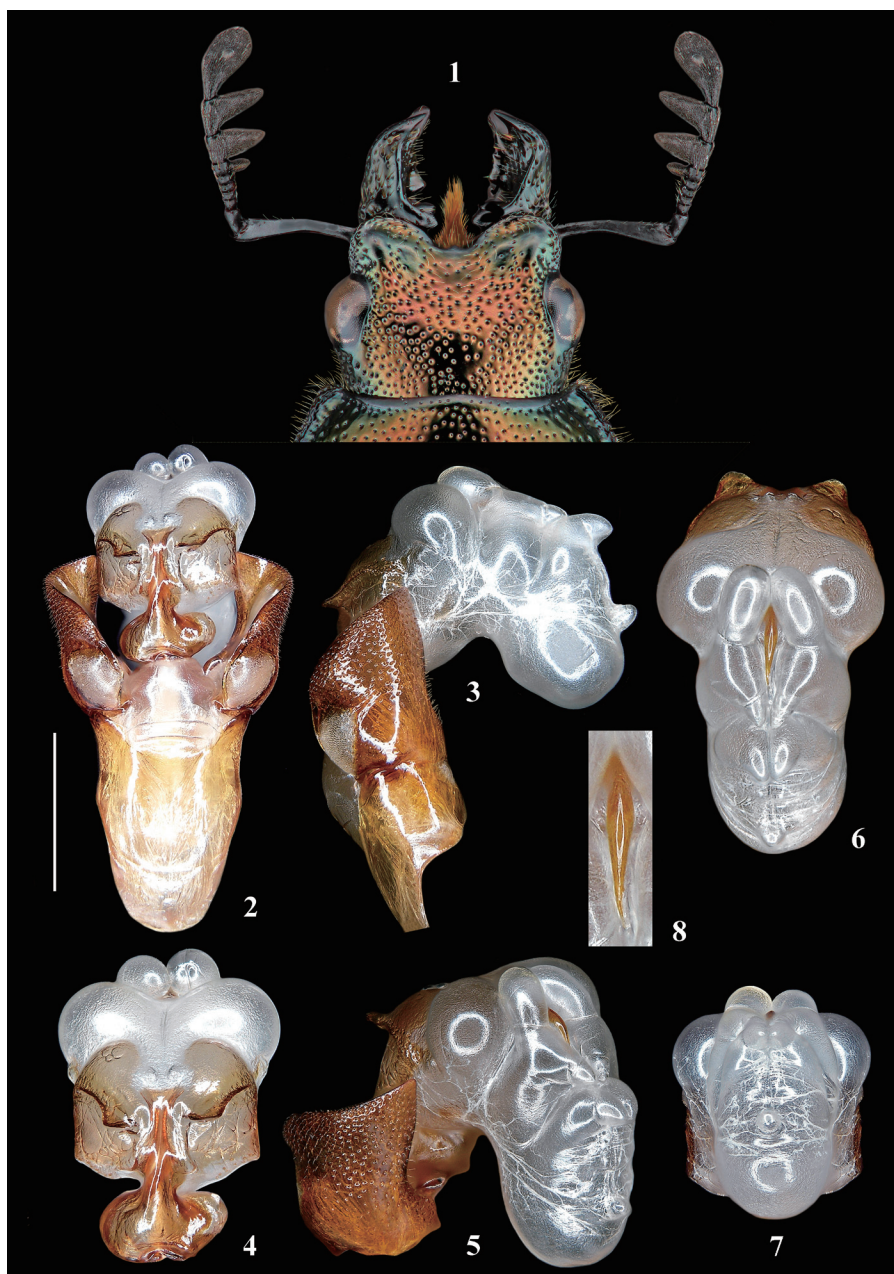
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### 1. *Platycerus ladyae* IMURA, 2005

(Figs. 1–7)

*Platycerus ladyae* IMURA, 2005, Elytra, Tokyo, 33, p. 507, figs. 12–17. — IMURA, 2010, The genus *Platycerus* of East Asia, p. 98, figs. 1–3.

*Description of the male genitalia.* Total length of male genitalia measured from basal tip of basal piece to apical end of paramere about three-eighths as long as elytra. Basal piece with the apical margin on ventral side thin and semitransparent, subtrapezoidally produced apicad and widely emarginate at middle. Parameres obviously shorter than basal piece, bearing a large, nearly circular semitransparent fenestra at the baso-inner corner on ventral side of each piece; viewed laterally, each piece wide and robust, with the apico-dorsal corner not sharply pointed, baso-ventral corner obliquely incised. Apical portion of penis bifurcated into a pair of subovoid-shaped terminal plates; visor-like protrusion on each plate similar in profile to each other, both triangularly protruded ventrad in the innermost portions with the tips gently rounded, but asymmetrical in position, the right one situated a little more distally than the left. Internal sac relatively small, with the basic structure almost as in the members of the group of *P. dundai*; basal portion distinctly swollen outwards, though not forming any lobe, faintly depressed along the longitudinal mid-line, with a pair of small protrusions near the base;



Figs. 1–8. Male head and genital organ of *Platycerus ladyae* from Mt. Erlang Shan of central Sichuan, Southwest China, collected in 2012. — 1, Head in dorsal view; 2, basal piece, parameres and penis with fully inflated internal sac in ventral view; 3, ditto in right lateral view; 4, penis with fully inflated internal sac in ventral view; 5, right paramere, penis and fully everted internal sac in right subdorsal view; 6, apical part of penis and fully inflated internal sac in dorsal view; 7, apical part of fully inflated internal sac in apical view; 8, flagellum in dorsal view. Scale: 1 mm for 2, 0.9 mm for 3, 0.8 mm for 7, 0.7 mm for 4–6, 0.3 mm for 8.

median portion with two pairs of PFL; 1PFL larger, subcylindrical, gently arcuate along dorsal wall of internal sac; both the left and right lobes closely adhered to each other near the bases and apices, with the tips rounded at the basal end and conically pointed at the apical end; 2PFL much smaller, forming a pair of closely adhered protrusions with the tips conically pointed and much more distinctly prominent dorsad than apical tips of 1PFL; PA short, bearing a single small projection near its apical end; apical portion of internal sac unilobed and hemispherically swollen; flagellum rather short and robust, spindle-shaped, widest before the middle, more gradually narrowed towards apex than towards base.

*Specimens examined.* 3 ♂♂, 1 ♀, eastern slope of Mt. Erlang Shan [二郎山], 29°52'40.0"N/102°17'53.2"E, 2,300 m in altitude, near the southwestern corner of Tianquan Xian [天全县] in Ya'an Shi [雅安市], central Sichuan, Southwest China, larvae collected in the field on 27-IV-2012 by Y. IMURA and emerged in the laboratory in VIII-2012, preserved in the collection of Y. IMURA (Yokohama).

*Notes.* This species is peculiar in having a large head and uniquely shaped male mandibles, with the dorsal colour purplish brown to coppery maroon in both the sexes which is unusual for a member of the genus *Platycerus*. Short and robust paramere bearing a large fenestra on ventral side can be also regarded as an outstanding characteristic of this species. It is not easy to elucidate a true affinity of such a strange species by appearance alone. However, its internal sac resembles in many respects that of any member of the group of *P. dundai*. This fact, as well as the result inferred from the molecular phylogenetical study (IMURA & NAGAHATA, 2009), strongly suggests that *P. ladyae* would have derived from a common ancestor as that of the group of *P. dundai* which contains *P. dundai* and *P. feminatus* of central to southern Sichuan, *P. cupreimicans* of northwestern Yunnan, *P. mandibularis* of Guizhou, and *P. tabanai* of southern Shaanxi to western Henan.

All the specimens examined in this study were collected as larvae from the brown-rotten branches fallen down on the humid floor of the deciduous broad-leaved forest, and emerged in the laboratory three months later. In Erlang Shan, this species is sympatric with *P. tieguanzi* as mentioned in my previous paper (IMURA, 2010, pp. 100–101), though the larvae of the latter seem to prefer drier environment, e.g., white-, gray- or brown-rotten part of the standing withered wood or dead branches protruded from the trunk with various sizes.

## 2. *Platycerus dundai* IMURA et BARTOLOZZI, 1994

*Platycerus dundai* IMURA et BARTOLOZZI, 1994, Elytra, Tokyo, **22**, p. 142, figs. 2, 4. — IMURA, 2005, *ibid.*, **33**, p. 502, figs. 1–8 (pp. 503–505). — IMURA, 2010, The genus *Platycerus* of East Asia, p. 74, figs. 1–3 (p. 72) & 5–8 (p. 78).

*Platycerus benesi* IMURA et BARTOLOZZI, 1994, Elytra, Tokyo, **22**, p. 140, figs. 1, 3.

*Specimens examined.* 1 ♂, 2 ♀♀, ca. 20 km distant to the north-northwest from Moxi [磨西], 29°46'31.8"N/102°03'41.3"E, 2,400 m in altitude, in Luding Xian [泸定县] of Garzê-zangzu-zizhizhou [甘孜藏族自治州], central Sichuan, Southwest China, 28-IV-2012, Y. IMURA leg.; 1 ♂, 1 ♀, same locality, larvae collected in the field on 28-IV-2012 by Y. IMURA and emerged in the laboratory in VIII-2012; all preserved in the collection of Y. IMURA (Yokohama).

*Notes.* This species was described from Hailuo Gou on the eastern slope of Mt. Gongga Shan in central Sichuan, together with *P. benesi* from Moxi at the entrance of Hailuo Gou, both on the basis of a single female (IMURA & BARTOLOZZI, 1994). Later, I examined ample specimens including the male from Hailuo Gou, and synonymized *P. bebesi* with *P. dundai* (IMURA, 2005). Since then, however, no contribution has been made on this species. In the spring of 2012, I was able to collect some *Platycerus* specimens referable to *P. dundai* from the forest lying about 20 km to the north-northwest

of Moxi. They are almost identical with the topotypical ones in both external and genitalic features.

The habitat of this new population is rather old deciduous broadleaved forest partly mixed with *Rhododendron* and coniferous trees, with the altitude of 2,400 m. The adult and larva were found either from brown-rotten part of the withered branch (ca. 6 cm in diameter) fallen down on the ground or from rather thin dead branch (ca. 3 cm in diameter) protruded from the trunk. During my survey made on the same day, one larva and several oviposition marks were found from another forest which is about 5 km distant to the north from the above locality, with the altitude of 2,800 m. Though unable to make a reliable identification by larval morphology alone, it may belong to *P. dundai*.

### 3. *Platycerus hiurai* TANIKADO et TABANA, 1997

*Platycerus hiurai* TANIKADO et TABANA, 1997, Gekkan-Mushi, Tokyo, (316), p. 7, figs. 1-b, 3 (p. 5), 9–12 (p. 2). — IMURA, 2002, Gekkan-Mushi, Tokyo, (381), p. 20, figs. 2–8; 2008, Elytra, Tokyo, 36, p. 296; 2010, The genus *Platycerus* of East Asia, p. 68, figs. 1–3 (p. 66), 5–11 (p. 71).

*Specimens examined.* 1 ♂ (dead, broken specimen lacking genital organ), Guiqiangwan [桂蕎湾] Valley, 30°25'17.0"N/102°33'30.5"E, 2,380 m in altitude, in southern Baoxing Xian [宝兴县] of Ya'an-shi [雅安市], central Sichuan, Southwest China, 3–V–2012, Y. IMURA leg.; 3 ♀♀, Maoziwan [猫子湾] Valley, 30°26'15.4"N/102°33'31.8"E, 2,230 m in altitude, in the same area, larvae collected in the field on 3–V–2012 by Y. IMURA and emerged in the laboratory in VIII–2012; all preserved in the collection of Y. IMURA (Yokohama).

*Notes.* This species was originally described from the northern part of Meigu Xian of southern Sichuan based on a pair of male and female specimens (TANIKADO & TABANA, 1997), and recorded later from five other localities in Sichuan, e.g., Mt. Xilingxue Shan, Mt. Emei Shan, Wolong, Laba He Nature Reserve and Bori Gou of northern Baoxing Xian (IMURA, 2002, 2008). Of these, the Xilingxue Shan race was described as a distinct subspecies named *P. h. tanikadoi* (IMURA, 2002). However, our knowledge is still very poor on the distribution and geographical variation of this unique platycerine beetle, since it is very rare at any collecting site. So far as I have examined, "*P. hiurai*" identified by its appearance shows considerable variation in conformation of the internal sac of the male genitalia, and could be regarded as a species-complex consisting of several different species. For the time being, I suspend judgment on the taxonomic account of each population of this complex including that recorded in the present paper.

In Guiqiangwan and Maoziwan, this platycerine beetle was found mainly from white-, gray- or brown-rotten part of standing withered wood or dead branches. No sympatrically occurring *Platycerus* species has theretofore been found in these two localities.

## 要 約

井村有希：レディルリクワガタの♂交尾器形態と中国四川省における稀少なルリクワガタ属2種の記録(鞘翅目クワガタムシ科)。—— レディルリクワガタは、中国四川省中部の二郎山から記載された、紫褐色の色彩と大きい頭部、それに波曲した奇妙な形の大顎をもつ顕著な種であるが、その♂交尾器についてはこれまで、基片と側片、それに陰茎の形態が図示、記載されているにすぎなかった。本論文では、あらたに得られた新鮮標本を用いて、完全に膨隆させた♂交尾器内囊の形態を図示、記載した。その結果、本種はそのユニークな外観とはうらはらに、ダウンダルリクワガタ種群に属する各種にもっとも類縁に近いことが示唆された。これはミトコンドリアDNAを用いた分子系統解析の結果とも矛盾しない。本論文ではさらに、四

川省中部の2地点から、これまで知見の少なかったルリクワガタ属の2種、ドゥンダールリクワガタとウラクロルリクワガタを記録し、若干の考察を加えた。

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