

Comparison of Endophallic Morphology between *Platycerus yingqii* HUANG et CHEN and *Platycerus tabanai* TANIKADO et OKUDA (Coleoptera, Lucanidae)

Xue-Jiao ZHU¹⁾, Tao MA²⁾, Xiu-Jun WEN²⁾ and Kôhei KUBOTA¹⁾

¹⁾Laboratory of Forest Zoology, Graduate School of Agricultural and Life Sciences,
The University of Tokyo, Bunkyo-ku, Tokyo, 113–8657 Japan

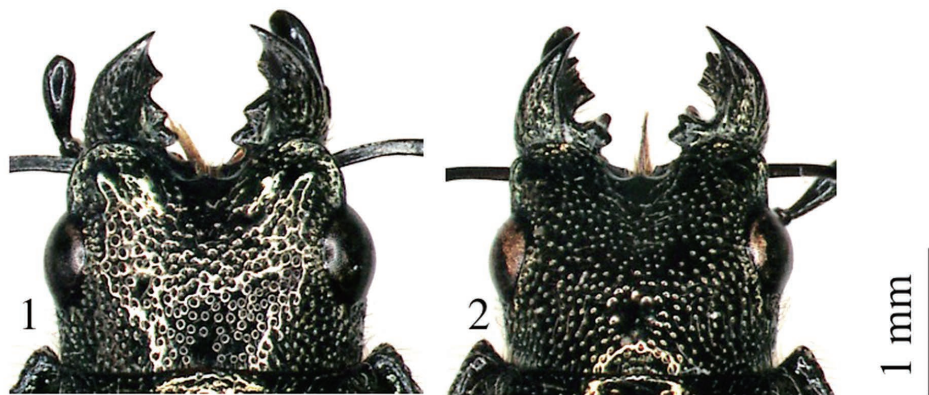
²⁾College of Forestry and Landscape Architecture, South China Agricultural University, Wushan Road,
Tianhe District, Guangzhou, Guangdong, 510642 China

Abstract The fully inflated endophallic morphology of *Platycerus yingqii* is described for the first time. Although *P. yingqii* had been regarded as a member of ‘Group of *Platycerus hongwonpyoi*’, its genital morphology was found to be very similar to that of *Platycerus tabanai*, which belongs to ‘Group of *Platycerus dundai*’.

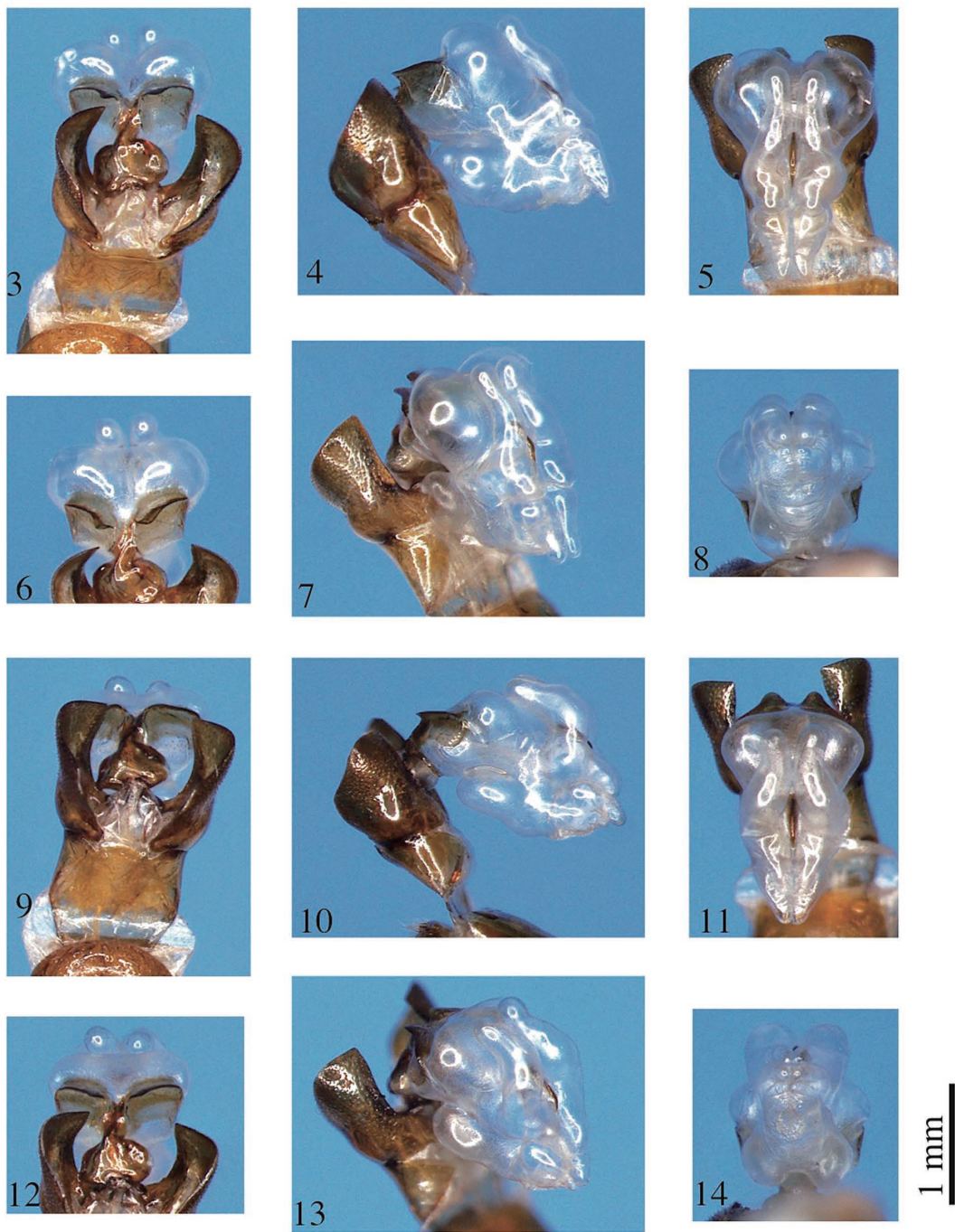
Platycerus yingqii HUANG et CHEN is the first taxon of the genus *Platycerus* described by Chinese entomologist, based on the specimens collected on the northern slope of Mt. Taibaishan, Shaanxi Province, China (HUANG & CHEN, 2009). This species is characterized by having brownish matte elytral surface as in *P. tabanai* TANIKADO et OKUDA, and mandibles with unidentate subapical ventral teeth as in *P. rugosus* OKUDA (Fig. 1). The latter character is unique, since most Asian *Platycerus* species have mandibles with multi-dentate subapical ventral teeth (Fig. 2). The detailed morphological features of *P. yingqii* were described by HUANG and CHEN (2009) and IMURA (2010). However, its fully inflated endophallic morphology, which is one of the important diagnostic characters of the genus *Platycerus*, has not yet been shown. In the autumn of 2016, we had an opportunity to collect some fresh samples of *P. yingqii* from its type area and succeeded in examining their fully inflated endophalli. In this paper, we describe the detailed structure of the fully inflated endophallus of *P. yingqii* for the first time, and compare it with that of *P. tabanai*.

Before going further, we wish to express our thanks for the support provided by the Oversea Study Program of Guangzhou Elite Project (No. SUJING [2015]4) to X.-J. ZHU, and by a Grant-in-Aid (25292082) to K. KUBOTA from the Japan Society for the Promotion of Science.

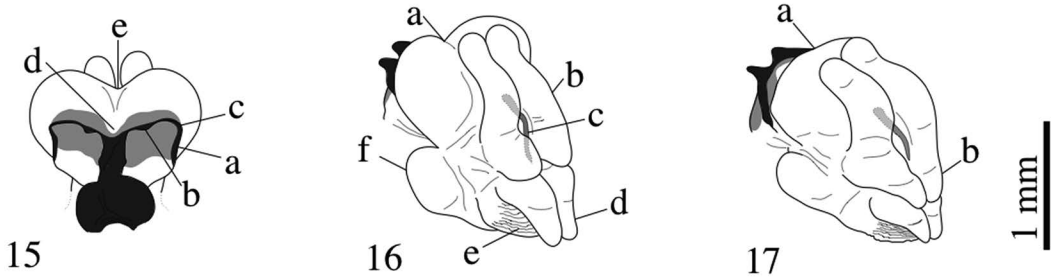
As to the morphological terms and homologies, we follow those provided by KUBOTA *et al.* (2008, 2009).



Figs. 1–2. Male heads of *Platycerus* spp. in dorsal view. — 1, *P. yingqii*; 2, *P. tabanai*.



Figs. 3–14. Male genital organs of *Platycerus* spp. — 3–8, *P. yingqii*; 9–14, *P. tabanai*. — 3 & 9, Lateral piece, parameres, and aedeagal plate in ventral view; 4 & 10, completely inflated endophallus on aedeagus in right lateral view; 5 & 11, ditto in dorsal view; 6 & 12, ditto in ventral view; 7 & 13, ditto in right sub-dorsal view; 8 & 14, ditto in antero-dorsal view.



Figs. 15–17. Line drawings of male genital organs of *Platycerus* spp. — 15 & 16, *P. yingqii*; 17, *P. tabanai*. — 15, Aedeagal plate in ventral view; 16 & 17, completely inflated endophallus on aedeagus in right sub-dorsal view. — 15a, b & c, One of distal plate; 15d, basal part of endophallus; 15e, 16a & 17a, boundary between paired posterior lobes (lobe I) in medial part; 16b & 17b, one of a pair of anterior lobes (lobe II) in medial part; 16c, flagellum; 16d, one of a pair of lobes in subapical part; 16e, pleat-like wrinkles in subapical part; 16f, one of bilateral lobes in apical part.

Platycerus yingqii HUANG et CHEN, 2009

(Figs. 1, 3–8, 15, 16)

Platycerus yingqii HUANG et CHEN, 2009: 7, figs. 1, 2, 6, 7, 12, 13; 8, figs. 16, 21–23, 27, 28; 12, figs. 33, 34, 41, 42, 52; 13, figs. 54, 55, 62, 63, 72; 17, figs. 74, 75; 19, figs. 84–93; 23, figs. 123, 127, 131; 26, figs. 135, 136. — IMURA, 2010: 46, figs. 1–3.

Male genitalic morphology. Male genitalia with lateral lobe; apical margin of lateral piece roundly produced; distal part of aedeagal plate sclerotized and bifurcated, connected by membranous part; each plate arcuate and clearly ridged towards the outside, similar to that of *P. tabanai* (Figs. 3, 6, 9, 12 & 15a), sclerotized and visor-like at sub-basal part (Figs. 3, 6, & 15b); corners of distal parts of subapics more acute than those of *P. tabanai* (Figs. 6, 12 & 15c); endophallus very similar to that of *P. tabanai* (Figs. 3–17); basal part very short (Figs. 3 & 15d); medial part bearing a pair of posterior lobes (lobe I) and a pair of anterior lobes (lobe II); lobe I clearly separated into two large hemispheres (Figs. 5, 7, 15e & 16a), whereas boundary *P. tabanai* lobes is ambiguous and flat (Fig. 17a); lobe II long and cylindrical with hemispherical apices, bent outward at middle part (Figs. 4, 5, 7, 16b), shorter anterior than those of *P. tabanai* (Fig. 17b); flagellum projected from vertical surface of endophallus (Figs. 5, 7 & 16c); subapical part with a pair of long cylindrical lobes (Figs. 4, 5, 7, 8 & 16d) and pleat-like transverse wrinkles on both sides (Figs. 4, 7, 8 & 16e); apical part bearing large bilateral lobes (Figs. 4, 7, 8 & 16f).

Specimens examined. 3 ♂, northern slope of Mt. Taibaishan (太白山), 1,860 m alt., Mei-xian (眉县), Baoji City (宝鸡市), Shaanxi Province (陕西省), China, 10.X.2016, X.-J. ZHU, K. KUBOTA and T. MA leg., preserved by the authors.

Platycerus tabanai TANIKADO et OKUDA, 1994

(Figs. 9–14, 17)

Platycerus tabanai TANIKADO et OKUDA, 1994: 3, figs. 6–10 on pl. 2; 6, fig. 3; 7, fig. 4. — IMURA, 2010: 102, figs. 1–3.

Male genitalic morphology. Refer to TANIKADO et OKUDA (1994, fig. 4), IMURA (2010, p. 102, figs. 1–3) and figs. 9–14 and 17 in this paper.

Specimens examined. 2 ♂, Banfangzi (板房子), 1,950 m alt., Zhouzhi-xian (周至县), Xi'an City

(西安市), Shaanxi Province (陕西省), China, 11.X.2016, X.-J. ZHU, K. KUBOTA and T. MA leg., preserved by the authors.

Discussion

IMURA (2010) regarded *Platycerus yingqii* as a member of ‘Group of *Platycerus hongwonpyoi*’ based on its external and genital morphology, though he was unable to take the findings of fully inflated endophallus into account. However, the endophallic morphology of *P. yingqii* is quite different from that of three known species belonging to that species group (KUBOTA *et al.*, 2009: Figs. 16, 28; IMURA, 2010: pp. 28, 40; HUANG *et al.* 2010: Figs. 18–22). Judging from the inflated endophallic morphology examined in this study, *P. yingqii* is most closely related to *P. tabanai*, which belongs to ‘Group of *Platycerus dundai*’.

要 約

朱 雪皎・馬 涛・温 秀軍・久保田耕平：タイバイルリクワガタ *Platycerus yingqii* HUANG et CHEN とテツイロルリクワガタ *Platycerus tabanai* TANIKADO et OKUDA の内袋形態比較 (鞘翅目クワガタムシ科)。———タイバイルリクワガタの完全に膨張した状態の内袋形態を初めて記載した。この種はチョウセンリクワガタ種群 Group of *Platycerus hongwonpyoi* の一員と考えられていたが、その内袋形態はドゥンダルリクワガタ種群 Group of *Platycerus dundai* に属するテツイロルリクワガタのそれと非常に類似していた。

References

- HUANG, H., & C.-C. CHEN, 2009. Notes on the morphology, taxonomy, and natural history of the genus *Platycerus* GEOFFROY from China, with the description of a new species (Coleoptera: Scarabaeoidea: Lucanidae). *Zootaxa*, **2087**: 1–36.
- HUANG, H., C.-C. CHEN & Y. IMURA, 2010. A new species of the genus *Platycerus* GEOFFROY (Coleoptera, Lucanidae) from Gansu, China. *Elytra, Tokyo*, **38**: 233–238.
- IMURA, Y., 2010. The Genus *Platycerus* of East Asia. 240 pp. Roppon-Ashi Entomological Books, Tokyo. (In Japanese, partly in English and Chinese.)
- KUBOTA, K., N. KUBOTA & H. OTOBE, 2008. A revision of *Platycerus acuticollis* Y. KUROSAWA (Coleoptera, Lucanidae) and its closely related species. *Biogeography*, **10**: 79–102.
- KUBOTA, K., N. KUBOTA, H. OTOBE & Y. NAGAHATA, 2009. A morphological phylogeny of the genus *Platycerus* (Coleoptera, Lucanidae) in Japan. *Biogeography*, **11**: 57–72.
- TANIKADO, M., & N. OKUDA, 1994. Two new species of the genera *Ceruchus* and *Platycerus* (Coleoptera, Lucanidae) from the Qinling Mountains in Shaanxi Province, central China. *Gekkan-Mushi, Tokyo*, (278): 3–9.

Manuscript received 25 August 2018;
revised and accepted 27 September 2018.