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● *Chrysozephyrus dongi* spec. nov. from Pu'er, southern Yunnan (Lepidoptera: Lycaenidae)

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Abstract: *Chrysozephyrus dongi* Huang spec. nov. is described from Pu'er, southern Yunnan. The new species is associated with *Photinia* species (Rosaceae), a genus rarely documented as a host plant for *Chrysozephyrus* hairstreaks. The adult habitus and male genitalia are illustrated and compared with those of *Chrysozephyrus paona* (Tytler, 1915), currently considered its closest relative based on wing-patterns. The relationships between the new species and other species are also discussed.

Keywords: China, *Chrysozephyrus*, host plant, new species, *Photinia*

● 滇南普洱金灰蝶属一新种（鳞翅目：灰蝶科）

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摘要: 新种董氏金灰蝶 *Chrysozephyrus dongi* Huang spec. nov. 发现于云南南部的普洱市。该物种的寄主植物为石楠属 (*Photinia*, 蔷薇科), 这一属植物在金灰蝶属中极少被记录为宿主。本研究提供了该新种的成虫两性形态及雄性外生殖器特征图示, 并与目前基于翅斑纹认为其最近缘的物种——帕金灰蝶 *Chrysozephyrus paona* (Tytler, 1915) 进行了对比。文中还讨论了新种与其他相关物种的系统关系。

关键词: 中国, 金灰蝶属, 寄主植物, 新种, 石楠属

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● Introduction

Chrysozephyrus hairstreaks are seldom encountered in relatively low-elevation forests of tropical regions or adjacent areas. To date, only about three species have been recorded inhabiting tropical forests at elevations of 1400–1600 m in Indo-China and Hainan (Koiwaya & Monastyrskii 2010; Saito & Hasegawa 2016; Hsu *et al.* 2021). Quite unexpectedly, a white-underside *Chrysozephyrus* hairstreak was photographed by the junior author and her cousin, Mr. Dong Yun-Feng, in a lowland forest at Pu'er, southern Yunnan, where *Arhopala* oakblues are abundant. The species has been observed by the discoverers and their colleagues on only a few occasions over a time span of three years. The senior author successfully collected several specimens in 2024 and 2025, in total three males and one female for this study. Detailed examination of male genitalia and mitochondrial DNA sequences confirmed this population to be a new species, leading to the present collaborative description.

● Abbreviations

BSNU: Biological laboratory of Shanghai Normal University, Shanghai, P.R. China

CHH: Collection of HAO HUANG, Qingdao, Shandong

LF: Length of forewing

TL: Type locality

● Taxonomy

Lycaenidae

Chrysozephyrus dongi Huang spec. nov. 董氏金灰蝶

<https://zoobank.org/E82C609E-B008-4728-B670-D65D0BDE9F34>

Figs 1, 5–12, 16

Holotype: male (LF: 20.1 mm): China, Yunnan, Pu'er City, Simao District, Chashan (22.7137°–22.7442° N, 100.9673°–100.9964° E), 1436 m, 25.IV.2025, H. Huang leg. (will be deposited in BSNU).

Paratypes: 2 males (CHH; LF: 20.3–20.5 mm), 1 female (CHH; LF: 20.5 mm), same locality as holotype, 1360–1430 m, 16.V.2024 & 26–27.IV.2025, H. Huang leg.

Etymology. The species is named after Mr. Yun-Feng Dong, one of the discoverers of this new species.

Diagnosis. The new species is most similar to *Chrysozephyrus paona* (Tytler, 1915) in wing pattern, but can be distinguished by the following combination of characters:

Both sexes:

1) On hindwing underside the discal line runs straightly or slightly curves outwards across spaces 6–7, without any inward shift in space 7 relative to space 6.

2) On hindwing underside the discal line is situated closer to the termen at vein 2.

3) On hindwing underside the sub-tornal black spot is better-developed, accompanied by a larger interior orange patch medially.

4) On hindwing underside the subbasal line in space 7 is generally straighter and longer.

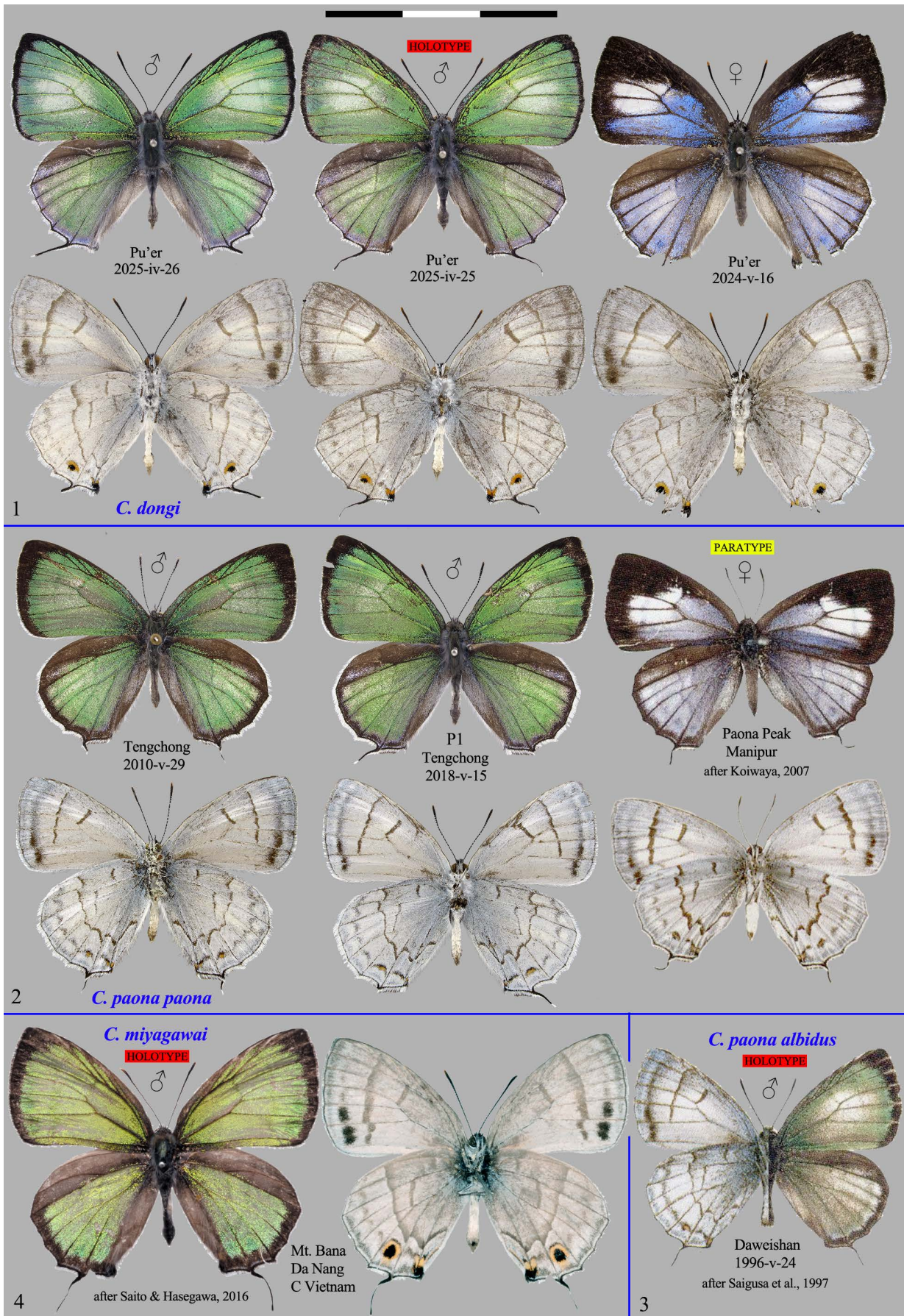
Male:

5) The black border on the forewing upperside is distinctly narrower.

6) The hindwing upperside, bears a bluish-grey marginal band instead of a black border.

7) The aedeagus is more elongate, with a relatively longer and more strongly curved suprazonal sheath.

8) In lateral view, the valva shows a more tapered apex and more pronounced projection at the lower apical region.



FIGURES 1–4: Habitus of *Chrysozephyrus* species under same scale, upper side & underside. Scale bar = 1 cm.



FIGURES 5–12: Field observations of *Chrysozephyrus dongi* Huang **spec. nov.** 5–8 additional males and females in their natural habitat beyond the type series 9 larval host plant 10–12 female preparing to oviposit on a larval host plant. Photographs courtesy of Ms. MEI Fang and Mr. DONG Yun-Feng.

9) In ventroposterior view, the valva appears larger overall and displays a more conspicuous apical hook.

10) The falx exhibits a more elongated and acutely pointed lateral angle.

Female:

11) The black border on hindwing upperside is suffused thoroughly with bluish scales.

Discussion. In wing pattern, this new species more closely resembles *Chrysozephyrus paona* (Tytler, 1915) than other congeners. For comparative analysis, we examined two male specimens of *C. paona paona* (Tytler) from Tengchong, western Yunnan, in addition to published literature. Notably, while *Chrysozephyrus paona* (Tytler) occurs in southern Yunnan as the subspecies *albidus* Saigusa, Nakanishi & Liang, 1997, it inhabits in significantly higher altitude habitats (above 2000 m). The Kimura 2-parameter genetic distance between the new species and *C. paona paona* (Tytler) is 0.0435.

The new species also displays considerable similarity to *C. miyagawai* Saito & Hasegawa, 2016 (= *C. ngoclinhensis* Yoshino, 2023; synonymized by Inayoshi (2023)), another white-underside *Chrysozephyrus* species from low altitude areas in central Vietnam. However, this species can be readily distinguished by: (1) the presence of black marginal borders on hindwing upperside in male, (2) the larger sub-tornal black spot on hindwing underside, and (3) the shape of valvae and falx in male genitalia. Inayoshi (2023) demonstrates that *C. ngoclinhensis* Yoshino, 2023 from central Vietnam falls within the intraspecific variation range of *C. miyagawai* Saito & Hasegawa in both wing patterns and male genitalia.

Regarding the male genital configuration, the new species shares certain characters with *C. duma* (Hewitson, 1869) and *C. dumoides* (Tytler, 1915) in valvae, but exhibits considerable differences in falx structure and wing patterns. However, the similar valvae structures likely represent a case of parallel evolution rather than close phylogenetic relationship.

Preliminary analysis of the mitochondrial *COI* barcoding region of a limited amount of samples suggests the new species may be more closely related to *C. changchini* Huang, 2019 (Kimura 2-parameter distance = 0.0276) than to other examined species. However, this phylogenetic hypothesis requires validation through a broader sampling.

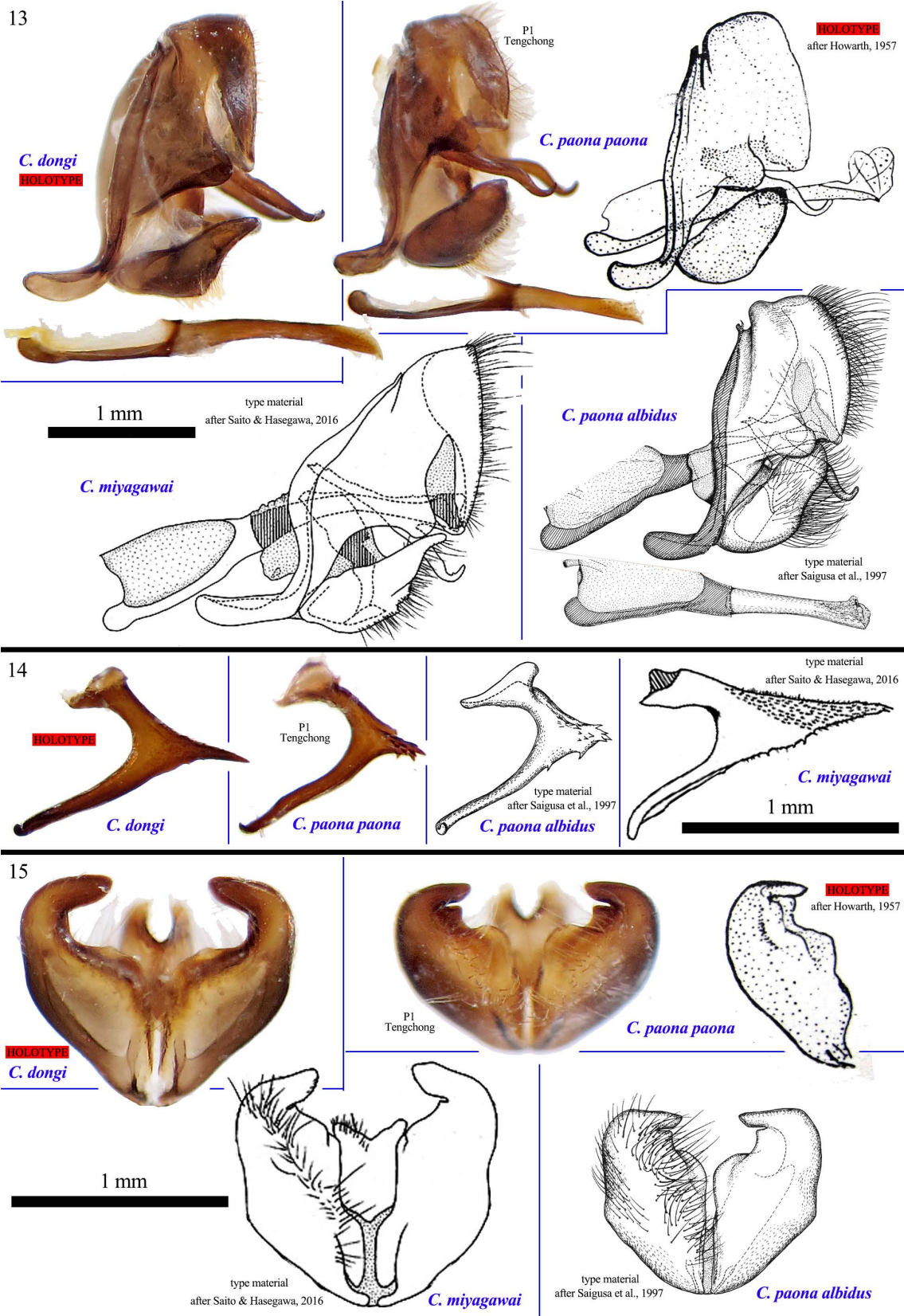
Host plant. Ms. Mei Fang observed a female of *C. dongi* Huang **spec. nov.** moving among the branches and leaves of a plant identified by Mr. Li Zhi-Hong as *Photinia glomerata* Rehder & E.H. Wilson (Rosaceae). The female was seen actively searching for suitable oviposition sites and was observed curving its abdomen against a branch, suggesting egg-laying behavior. Unfortunately, Ms. Mei did not try to locate any deposited eggs, so the precise oviposition site could not be determined.

Plants in the families Fagaceae, Rosaceae, and Ericaceae (Shirôzu 1961; Koiwaya 2007; Hasegawa *et al.* 2017; Hsu 2018) have been documented as host plants for species of the genus *Chrysozephyrus* Shirôzu & Yamamoto, 1956, with Fagaceae serving as the primary host family for most species. Within Rosaceae, host plants have been recorded for at least ten species (Koiwaya 2007): species of the genus *Prunus* for seven *Chrysozephyrus* species; *Sorbus* for one species; and *Photinia* for two species (Hsu & Liu 2002). Notably, the association with *Photinia* appears to have evolved independently, as the three *Chrysozephyrus* species utilizing these plants (*C. dongi* Huang **spec. nov.**, *C. shimizui* Yoshino, 1997, and *C. fujiokai* Koiwaya, 2000 [= *C. obscurus* Hsu & Liu, 2002]) exhibit significant differences in both wing patterns and male genital morphology.

Field observations. In addition to the type series, at least two additional males and two females were documented through field photography (Figs 5–12). The species is univoltine, as confirmed by multiple observations conducted by the authors' colleagues over three years, with adults only found between mid-April and late May.

The population inhabits in a restricted stream valley at elevations between 1,360–1,450 m. Adult specimens were primarily observed during afternoon hours (13:00–16:00 local time) while perching on low-growing vegetation in the valley bottom. Extensive searches conducted by the author on surrounding slopes and ridge tops yielded no result, though Ms. Mei did record a single male individual along a hillside trail within the valley system.

Range. Southern Yunnan.



FIGURES 13–15: Male genitalia of *Chrysozephyrus* species in comparison under same scale [except for holotype of *C. paona paona* (Tytler, 1915)] 13 whole genitalia in lateral view 14 falx in full-face view 15 valvae (valva) in ventroposterior view (full-face view).



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FIGURES 16: Male genitalia of *Chrysozephyrus dongi* Huang spec. nov. in more details. Scale bars = 1 mm.

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Mr. Dong Yun-Feng first discovered this rare hairstreak and shared the GPS information with the senior author. Ms. Mei Fang observed a female in oviposition and recorded the host plant. Mr. Li Zhi-Hong helped to identify the host plant. Mr. Li Ying-Hui accompanied the senior author during his collecting trips to Pu'er in 2024 and 2025. Mr. Yutaka Inayoshi helped in literature.

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● Additional information

Author contributions: First author: Conducted specimen collection and all research work, including morphological comparisons, species description, and manuscript preparation. Second author: As one of the initial discoverers of this species, provided critical locality data for the type specimens, enabling subsequent research.

Conflict of interest: The authors have declared that no competing interests exist.

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