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● Review of the genus *Calyptra* Ochseneimer, 1816 (Lepidoptera, Erebidae, Calpinae) from Southeast Xizang

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Abstract: This study records five species of the genus *Calyptra* Ochseneimer, 1816 from southeastern Xizang, China. Among these species, *C. orthograptia* (Butler, 1886) and *C. gruesa* (Draudt, 1950) are newly reported for the first time in Xizang. The other three species, *C. fletcheri* (Berio, 1956), *C. bicolor* (Moore, 1883) and *C. parva* Bänziger, 1979, were previously known from the region. This paper presents the diagnostic characters of the adults and their genitalia with high-resolution color images. An updated checklist of all known species of the genus *Calyptra* is also provided, along with the updated distribution information of these species both within China and worldwide.

Keywords: *Calyptra*, genitalia, newly recorded species, taxonomy

● 藏东南壶夜蛾属（鳞翅目，裳蛾科，壶夜蛾亚科）记述

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摘要: 本文记述了采自藏东南地区壶夜蛾属 *Calyptra* Ochseneimer, 1816 的五个种, 包括 2 西藏新记录种: 直壶夜蛾 *C. orthograptia* (Butler, 1886)、翎壶夜蛾 *C. gruesa* (Draudt, 1950); 以及 3 西藏原已知种: 弗莱彻壶夜蛾 *C. fletcheri* (Berio, 1956)、两色壶夜蛾 *C. bicolor* (Moore, 1883) 和小壶夜蛾 *C. parva* Bänziger, 1979。文章给出了这五个物种成虫及其外生殖器的鉴别特征, 提供了成虫及其外生殖器的清晰彩色图片, 并更新了壶夜蛾属世界已知物种名录及国内外分布情况。

关键词: 壶夜蛾属, 外生殖器, 新记录种, 分类

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● Introduction

The genus *Calyptra* was established by Duponchel in 1826, with *Calyptra thalictri* (Borkhausen, 1790) as the type species (Bashir *et al.* 2025). Currently, these moths are found in eastern Africa, Europe, the Russian Far East, sub-Himalayan South Asia, and Southeast Asia (Bänziger 1989, 2007; Zaspel *et al.* 2007, 2014). To date, this genus is known to include 18 species and 1 potential subspecies (Bänziger 1983; Bashir *et al.* 2025). According to the existing classification system, *Calyptra* and other fruit-piercing moth genera are all classified under the subfamily Calpinae (Fibiger 2005; Lafontaine 2006; Mitchell 2006; Zahiri 2012), which is further divided into four tribes Anomini (Grote, 1882), Calpini (Boisduval, 1840), Phyllochini (Hampson, 1913), and Scoliopterygini (Herrich-Schaffer, 1852) (Goater 2003; Fibiger 2005; Lafontaine 2006).

The genus *Calyptra* exhibits fruit-piercing behavior, which poses potential impacts on agriculture (Bänziger 2007). To date, ten species of this genus have been recorded in China (Bänziger 1983; Chen 1991, 1999; Bashir *et al.* 2025). This study reports five *Calyptra* species from southeastern Xizang, including two new records for Xizang, *C. orthograptus* and *C. gruesa*. Diagnostic characters of adults and their genitalia are provided with high-resolution color images. Additionally, this study updates the checklist of known *Calyptra* species and their distributions in China and worldwide (Bänziger 1983; Chen 1999; Bashir *et al.* 2025), enriches the diversity data of Erebidae in China, and provides theoretical and data support for the control of pests in agriculture, forestry, grassland husbandry, and animal husbandry.

● Material and methods

Specimens were collected from various locations in Linzhi City, Xizang, during May to July of 2015–2025. On each survey day, a 450 W high-pressure mercury lamp trapping system was set up from 9:00 p. m. to 1:00 a.m. A killing jar was prepared using a 25% ammonia water solution.

Adult photographs were taken using a Canon 5DIV camera, while genitalia photographs were captured with a Leica S9i microscope. All images were processed using Adobe Photoshop 2023. The terminology for the morphology of adults and genitalia follows the works of Bashir *et al.* (2025).

Checklist of the genus *Calyptra*

C. albivirgata (Hampson, 1926)

Distribution: China (Sichuan, Hunan); Japan.

C. bicolor (Moore, 1883)

Distribution: China (Xizang, Yunnan, Sichuan); India.

C. eustrigata (Hampson, 1926)

Distribution: Sri Lanka.

C. fasciata (Moore, 1882)

Distribution: India.

C. fletcheri (Berio, 1956)

Distribution: China (Xizang, Hebei, Sichuan).

C. gruesa (Draudt, 1950)

Distribution: China (Xizang, Shaanxi, Zhejiang, Hubei, Hunan, Xinjiang, Sichuan, Hainan, Fujian); Japan.

C. hokkaida (Wileman, 1922)

Distribution: China (Hubei); Russia; Japan; Korea.

C. imperialis (Grünberg, 1910)

Distribution: Rwanda.

C. lata (Butler, 1881)

Distribution: China (Heilongjiang, Hebei, Shandong, Fujian, Yunnan); Russia; Japan; Korea.

C. minuticornis (Guenée, 1852)

Distribution: China (Zhejiang, Fujian, Guangdong); Indonesia; India; Sri Lanka.

C. nyei Bänziger, 1979

Distribution: India.

C. ophideroides (Guenée, 1852)

Distribution: Indes Orientales.

C. orthograptia (Butler, 1886)

Distribution: China (Xizang, Taiwan, Sichuan, Hainan, Hubei, Guangdong, Hong Kong); India; Nepal; Japan; Thailand.

C. parva Bänziger, 1979

Distribution: China (Xizang); India; Thailand.

C. pseudobicolor Bänziger, 1979

Distribution: India; Myanmar; Bhutan.

C. subnubila (Prout, 1928)

Distribution: Indonesia.

C. thalictri (Borkhausen, 1790)

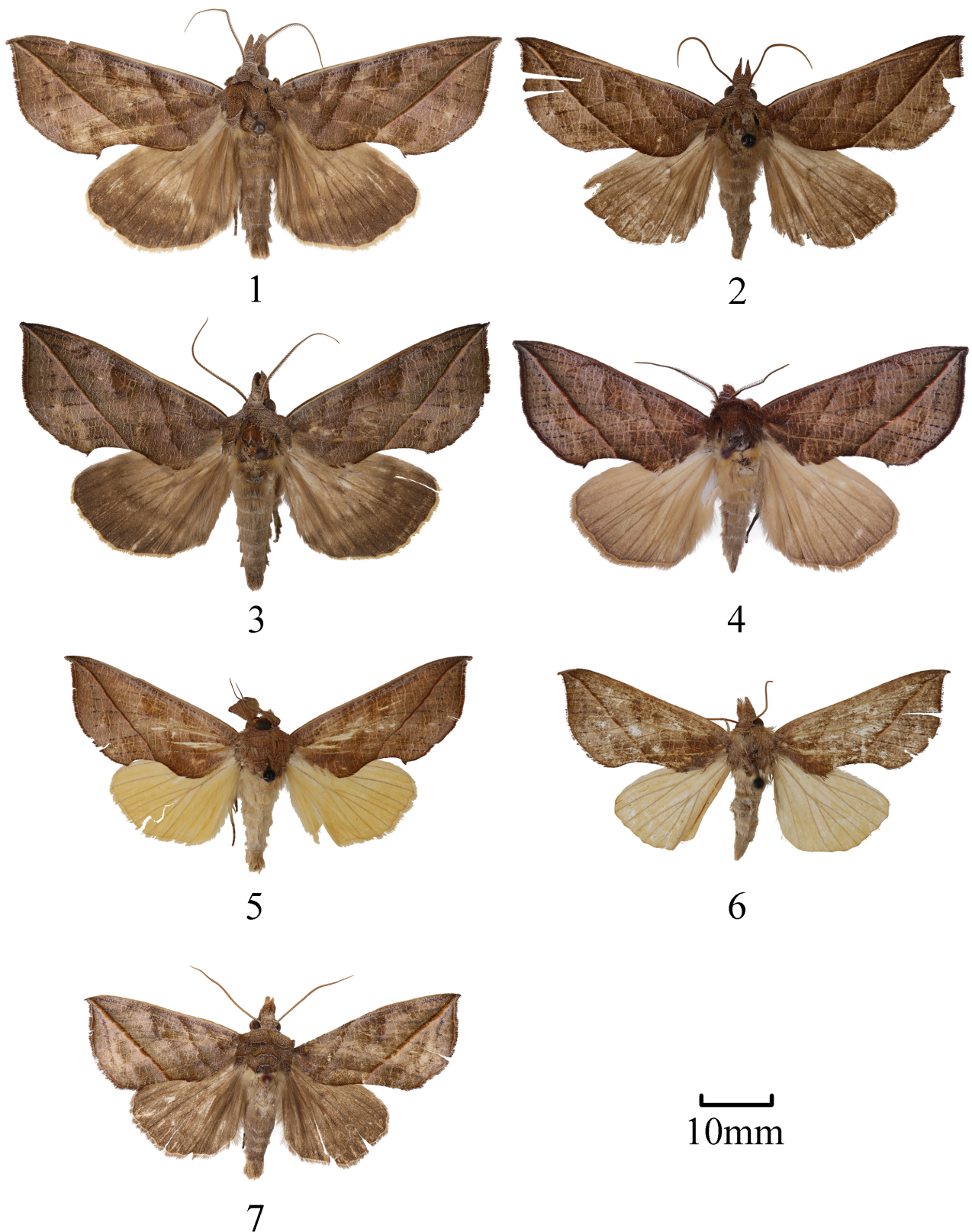
Distribution: China (Heilongjiang, Liaoning, Xinjiang, Shandong, Henan, Zhejiang, Fujian, Sichuan, Yunnan, Ningxia, Hebei); Russia; Japan; Korea; Mongolia; Eastern Kazakhstan; Central Asia; Middle East; Ukraine; Central and Southern Europe; North Africa.

C. canadensis (Bethune, 1865)

Distribution: North America.

Key to the species of genus *Calyptra* from Xizang

1. Hindwings yellow *C. bicolor*
 Hindwings not yellow 2
2. Male antennae bipectinate 3
 Male antennae simply serrate 4
3. Antennal outer pectinations long, inner pectinations short *C. gruesa*
 Antennae inner and outer pectinations equal in length *C. fletcheri*
4. Aedeagus short and broad, carina ear-shaped *C. orthograptia*
 Aedeagus slender and rod-shaped, dorsal side of carina with one thick spine *C. parva*



FIGURES 1–7. *Calyptra* spp.: 1 *C. orthograptata*, male 2 *C. orthograptata*, female 3 *C. gruesa*, male 4 *C. fletcheri*, male 5 *C. bicolor*, male 6 *C. bicolor*, female 7 *C. parva*, male. Scale bars: 10 mm.

● Taxonomy

Calyptra orthograpt (Butler, 1886) 直壺夜蛾 (New record for Xizang, China)

Calyptra orthograpt; Bänziger, 1983, *Insect Systematics & Evolution*, 14 (4): 478. f.10, 54–57.

Calyptra orthograpt; Bashir, 2025, *Insect* 16,534: p.8, f. 2–4.

Material examined: 1♂, 80K, Mêdog Co., Linzhi, Xizang, 9-VII-2018, leg. Z.H. Pan. 1♀, Hanmi Twp., Mêdog Co., Linzhi Xizang, 18-VII-2021, leg. Z.H. Pan. 1♀, Beibeng Twp., Mêdog Co., Linzhi, Xizang, 15-V-2023, leg. Z.H. Pan, Y.H. Jiang, X.R. Jiang.

Diagnosis. Adult (Fig. 1–2). *C. orthograpt* male antennae unidentate, female filiform. Forewing ground color brownish, tinged with dark red, inner margin gentler than that of other species, anal angle distinctly hooked. Hindwings with indistinct dark brown postmedial and submarginal lines, fringes yellowish-white. **Male genitalia** (Fig. 8) Uncus thickened. Juxta hexagonal and lamellate, strongly sclerotized medially with a distinct dividing line. Valva rhomboidal. Harpe short and digitate. Aedeagus with punctate protuberances on the dorsal side of the median part. Carina auriform. Vesica broad and rounded, densely covered with punctate cornuti. **Female genitalia** (Fig. 13). Papillae anales cylindrical. Apophyses slender. Ostium bursae broad, weakly sclerotized. Ductus bursae slender and membranous, membranous. Corpus bursae entirely membranous.

Distribution. China (Xizang, Taiwan, Sichuan, Hainan, Hubei, Guangdong, Hong Kong); India; Nepal; Japan; Thailand.

Calyptra gruesa (Draudt, 1950) 翎壺夜蛾 (New record for Xizang, China)

Calyptra gruesa; Bänziger, 1983, *Insect Systematics & Evolution*, 14(4): 472, f.4, 22–24.

Calyptra gruesa; Bashir, 2025, *Insect* 16, 534: p. 4, f. 2–3.

Material examined: 1♂, Gelin Vill., Medog Co., Linzhi, Xizang, 23-VI-2025, leg. Z.H. Pan, B. Zhao, X.H. Yang, S. Yang. 1♂, Beibeng Twp., Medog Co., Linzhi, Xizang, 13-V-2022, leg. Z.H. Pan, J.W. Hu, X.Y. Yin. 1♂, Beibeng Twp., Medog Co., Linzhi, Xizang, 14-V-2023, leg. Z.H. Pan. 1♂, Beibeng Twp., Medog Co., Linzhi, Xizang, 6-VII-2017, leg. Z.H. Pan.

Diagnosis. Adult (Fig. 3). Adult morphology similar to *C. orthograpt*, overall color darker. Male antennae bipectinate, outer pectinations longer, inner pectinations shorter. **Male genitalia** (Fig. 9) Uncus narrower than that of *C. orthograpt*. Juxta elliptical. Valva elliptical. Harpe long digitate. Carina of aedeagus sclerotized dorsally. Vesica elliptical, densely covered with spiniform cornuti.

Distribution. China (Xizang, Shaanxi, Zhejiang, Hubei, Hunan, Xinjiang, Sichuan, Hainan, Fujian); Japan.

Calyptra fletcheri (Berio, 1956) 弗莱彻壺夜蛾

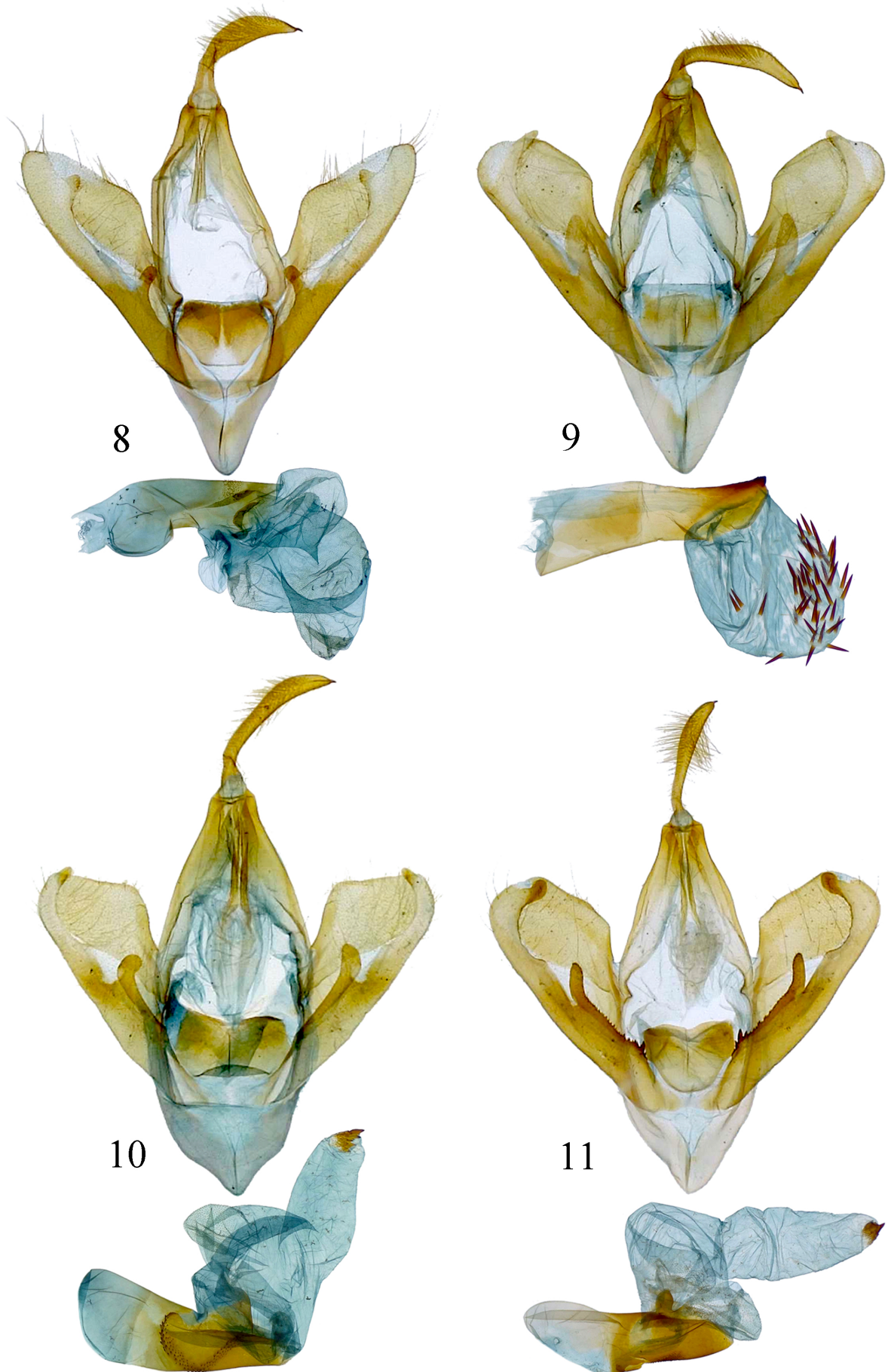
Calyptra fletcheri; Bänziger, 1983, *Insect Systematics & Evolution* 14(4): 472, f. 2, 41–43.

Calyptra fletcheri; Bashir, 2025, *Insect* 16, 534: p. 10, f. 2, 4.

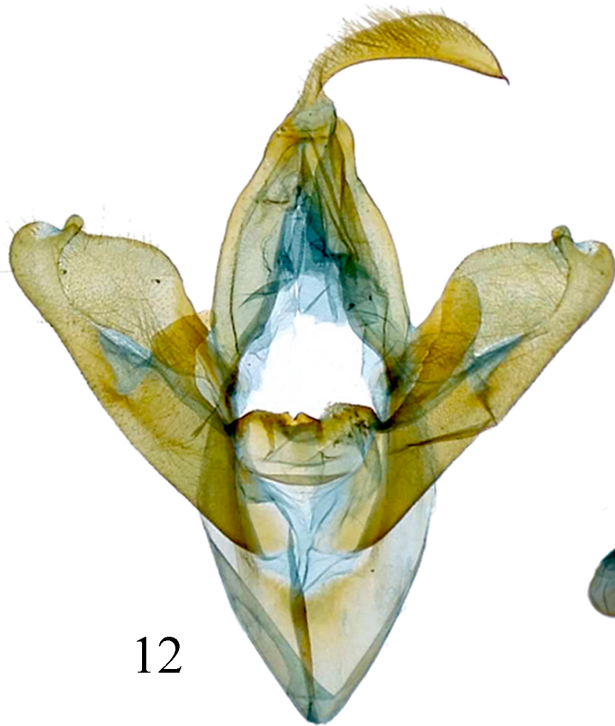
Material examined: 3♂, 80K, Medog Co., Linzhi, Xizang, 19–20-VI-2025, leg. Z.H. Pan, B. Zhao, X.H. Yang, S. Yang. 1♂, Beibeng Twp., Medog Co., Linzhi, Xizang, 10-V-2017, leg. Z.H. Pan.

Diagnosis. Adult (Fig. 4). Adults entirely reddish-brown. Male antennae bipectinate, outer and inner pectinations equal in length. Hindwings pale yellowish-white, outer margin tinged with grayish-brown. **Male genitalia** (Fig. 10) Uncus filiform, apex acute. Juxta ingot-shaped. Valva short and broad, rhomboidal. Harpe short digitate, one side relatively straight, the other inwardly curved. Aedeagus short and broad, with spirally arranged short spines at the median part. Vesica with a broad lamellate cornutus accompanied by thick spines at the apex.

Distribution. China (Xizang, Hebei, Sichuan).



FIGURES 8–11. Male genitalia of *Calyptra* spp.: 8 *C. orthograpti* 9 *C. gruesa* 10 *C. fletcheri* 11 *C. bicolor*.



12



13



14

FIGURES 12–14. Male and female of *Calyptra* spp.: 12 male 13 & 14 female 12 *C. parva* 13 *C. orthograpta* 14 *C. bicolor*.

***Calyptra bicolor* (Moore, 1883) 两色壶夜蛾**

Calyptra bicolor; Bänziger, 1983, *Insect Systematics & Evolution* 14(4): 471, f. 13, 27–31.

Material examined: 1♂, Beibeng Twp., Medog Co., Linzhi, Xizang, 17-VI-2017, leg. Z.H. Pan. 1♀, 80K, Medog Co., Linzhi, Xizang, 28-VI-2015, leg. Z.H. Pan. 1♂, Pailong Twp, Linzhi, Xizang, 25-VII-2020, leg. Z.H. Pan.

Diagnosis. Adult (Fig. 5–6). This species relatively smaller among the five. Male antennae bipectinate, female antennae filiform. Head, thorax and forewings light brown, with a prominent hooked anal angle. Hindwings and abdomen pale yellow. **Male genitalia** (Fig. 11) Uncus strip-shaped, apex acute. Juxta semi-elliptical. Valva semi-elliptical. Harpe digitiform, with a spinous band on the outer margin. Aedeagus short and broad, punctately sclerotized on the dorsal side of the median part, carina auriculate. Vesica with a broad lamellate cornutus accompanied by thick spines at the apex. **Female genitalia** (Fig. 14). Papillae anales cylindrical. Apophyses slender. Ductus bursae membranous at base, sclerotized at apex. Corpus bursae elliptical, with a strip-shaped sclerotized band bearing punctations at the median part.

Distribution. China (Xizang, Yunnan, Sichuan); India.

***Calyptra parva* Bänziger, 1979 小壶夜蛾**

Calyptra parva; Bänziger, 1983, *Insect Systematics & Evolution* 14(4): 478, f. 7, 84–86.

Material examined: 1♂, Hanmi TWP., Medog Co., Linzhi, Xizang, 9-VII-2021, leg. Z. H.Pan.

Diagnosis. Adult (Fig. 7). Adult morphology similar to *C. orthograptus*, but the body size is relatively smaller. Male antennae dentate on the inner side and edentate on the outer side. Forewings have a gentle hind margin and no hooked anal angle. Hindwings are entirely grayish-brown. **Male genitalia** (Fig. 12) Uncus thickened. Juxta ingot-shaped, slightly protuberant medially. Valva rhomboidal. Harpe thick digitate, one side relatively straight, the other inwardly curved with undulate notches. Aedeagus slender clavate, with a patch of short spiniform protuberances on ventral side of median part. Carina with a single strongly sclerotized thick spine dorsally. Vesica elliptical, without cornuti internally.

Distribution. China (Xizang); India; Thailand.

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● Additional information

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