

LETTER

Two new species of *Eumorphobotys* Munroe & Mutuura, 1969 (Lepidoptera: Crambidae) from China

Eumorphobotys Munroe & Mutuura, 1969 is a small genus with three species and restricted in southern China. The taxonomic studies were investigated by Caradja (1925), Munroe & Mutuura (1969) and Chen & Zhang (2018). The genus *Eumorphobotys* is diagnosed by the concolorous wings usually absent distinct markings and the relatively straight forewing termen in appearance; in male genitalia, by the short and stout uncus bearing sparse and slender hairs, the tapering valva bearing the finger-like dorsal sella, the ventro-distal sella forming a spine-shaped process exceeding beyond ventral margin of valva, or ventral margin of valva sclerotized and extended one or two protrusions in the middle, with ventral surface densely spinous and bearing a spine inside.

The genus has been revised by Chen & Zhang (2018). Here two additional species of *Eumorphobotys* from Sichuan and Yunnan are described as new to science.

Specimens used in this study were collected by light-trapping. Slides of genitalic dissections were prepared according to Robinson (1976) and Li & Zheng (1996), with some modifications. Terminology of genitalia follows Klots (1970), Munroe (1976), Maes (1995) and Kristensen (2003). Images of the adults were taken using a Canon EOS 60D camera provided with a Canon 100mm macro lens; the genitalia pictures were taken using Zeiss Axio Scope.A1 in combination with a Zeiss AxioCam camera and the Axio Vision SE64 programme on a Windows PC; source images were then aligned and stacked on Helicon Focus® to obtain a fully sharpened composite image.

All the examined specimens are deposited in the Insect Collection of Nankai University, Tianjin, China (NKU) and the Museum of Biology, Sun Yat-sen University (SYSBM).

Key to the species of *Eumorphobotys* Munroe & Mutuura, 1969

1. Wings with yellow marginal area..... *E. longicalcaratus* Chen & Zhang, sp. nov.
Wings without yellow marginal area..... 2
2. Forewing reddish brown; vesica with a long, spine-shaped cornuti almost half as long as entire phallus *E. horakae*
Background colour of forewing yellowish brown or smoky brown, cornuti finger-shaped or composed of a group of short spines, and less than half length of phallus..... 3
3. Ventral sella triangular; cornuti composed of a group of short spines; signum large, maximal length of signum longer than half diameter of corpus bursae *E. eumorphalis*
Ventral sella reduced; cornuti finger-shaped and covered with tiny teeth; signum small, maximal length of signum equal to or less than half diameter of corpus bursae 4
4. Hindwing diffused smoky brown, with exception of a pale yellow central area and inner margin; valva with two unequal protrusions on ventral margin; length of ductus bursae more than five times diameter of corpus bursae; maximal length of signum about half diameter of corpus bursae *E. concavuncus*
Hindwing pale yellow; valva with a protrusion on ventral margin; length of ductus bursae about 2–3 times diameter of corpus bursae; maximal length of signum less than 1/4 diameter of corpus bursae *E. uniprotrusus* Chen & Zhang, sp. nov.

***Eumorphobotys longicalcaratus* Chen & Zhang, sp. nov.** (Figs 1, 3)

Diagnosis. The new species can be distinguished from its congeners by its yellow marginal area of wings. It resembles *E. eumorphalis* (Caradja, 1925) in the male genitalia, but can be distinguished by the much narrower apex of the uncus, the longer, narrower and curved valva, the weakly sclerotized ventral sella, the longer spine-shaped process formed by ventro-distal sella exceeding outward, the uninflated sacculus, the narrower distal half of the juxta and the curved phallus bearing a group of spine-like cornuti appear hook-shaped.

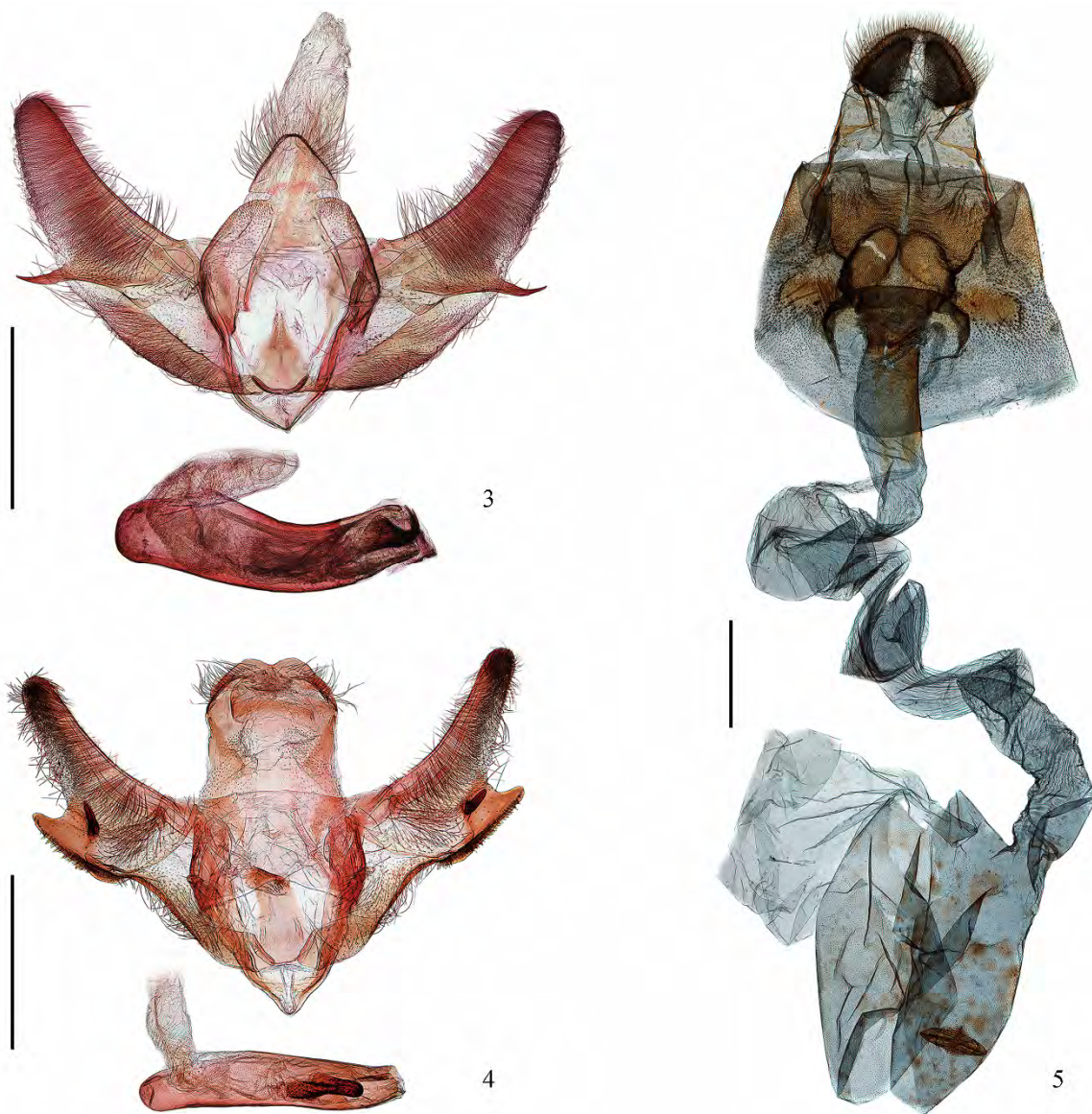
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Figures 1–2. Adults of *Eumorphobotys* spp. 1. *E. longicalcaratus* Chen & Zhang, **sp. nov.**, holotype, male (Mt. Emeishan, Sichuan). 2. *E. uniprotrusus* Chen & Zhang, **sp. nov.**, holotype, male (Mt. Gaoligongshan, Yunnan). Scale bars = 10.0 mm.



Figures 3–5. Genitalia of *Eumorphobotys* spp. 3. *E. longicalcaratus* Chen & Zhang, **sp. nov.**, holotype, male (genitalia slide no. ZDD12062). 4. *E. uniprotrusus* Chen & Zhang, **sp. nov.**, holotype, male (genitalia slide no. ZDD12089). 5. *E. uniprotrusus* Chen & Zhang, **sp. nov.**, paratype, female (genitalia slide no. ZDD12105). Scale bars = 1.0 mm.

Description. Head. Frons brown, with white lateral bands. Vertex brown. Labial palpus brown, length approximately 2.5 times as long as diameter of eye; first segment with white scales at base, third segment slightly pointed. Maxillary palpus brown, broadened distally. Basal scales of proboscis pale yellow. Antenna brown, with pale yellow scales dorsally, scape with white band anteriorly.

Thorax. Brown dorsally and greyish white ventrally. Foreleg yellowish brown, ventral side of tibia and dorsal side of tarsus dirty white. Midleg yellow; distal end of tibia with outer side bearing yellowish brown hairs-pencil, inner spur long and with equal length to femur, outer spur plate-shaped with distal end pointed and covered with pale yellow hairs, first tarsomere densely covered with hairs in male. Hindleg light yellow, outer spur about 1/2 length of inner one.

Wings. Wingspan 34.0–36.0 mm. Forewing ochre-brown, tinged with purplish bronze, veins dark brown; orbicular stigma dot-shaped, dark brown; reniform stigma stripe-shaped, thick, dark brown; subterminal line dark brown, sinuated and followed by broad yellowish marginal area; fringe yellow. Hindwing fuscous, veins dark fuscous; marginal area pale yellow and narrow; fringe pale yellow.

Abdomen. Brown dorsally and greyish white ventrally.

Male genitalia (Fig. 3). Uncus nearly triangular, distally rounded, dorsal and lateral margin sparsely covered with long and standing hairs. Tegumen trapezoid, significantly wider than uncus. Vinculum U-shaped. Saccus short-triangular. Transtilla with ventral process well developed. Valva tongue-shaped, slightly curved, tapering towards rounded apex; dorsal sella finger-shaped, weakly sclerotized, sparsely setose, ventro-basal sella nearly triangular, weakly sclerotized, ventro-distal sella forming a spine-shaped, strongly sclerotized process, exceeding beyond ventral margin of valva and directing outward; sacculus broad, expanding to middle of valva. Juxta violin-shaped, dorsal half narrow and wrinkled. Phallus cylinder-shaped, curved in middle, apex with a group of spine-like cornuti appear hook-shaped.

Female. Unknown.

Material examined. Holotype ♂, China: Wannian Temple, Mt. Emeishan, Sichuan, 29.59°N, 103.38°E, elev. 830 m, 14.VII.2014, leg. Teng Kaijian, Guan Wei, Wang Xiuchun, Liu Shurong, genitalia slide no. ZDD12062 (NKU). Paratypes. 5♂, China: Mabian, Yonghong, Sichuan, elev. 1200–1500 m, 22–23.VII.2004, leg. Ren Yingdang (NKU, SYSBM).

Distribution. China (Sichuan).

Etymology. The specific name derived from the Latin *longi-* and *calcaratus*, refers to the long inner spur with the same length to femur of midleg in male specimens.

***Eumorphobotys uniprotrusus* Chen & Zhang, sp. nov.** (Figs 2, 4–5)

Diagnosis. This species resembles *E. concavuncus* Chen & Zhang, 2018 in the appearance and the male genitalia, but can be distinguished from the latter by its pale yellow hindwing and the single triangular protrusion on ventral margin of valva. In the female genitalia, the new species differs from *E. concavuncus* by the well-developed and strongly sclerotized lamella postvaginalis, the larger corpus bursae and the smaller signum.

Description. Head. Frons brown, with white lateral bands. Vertex pale brown. Labial palpus brown, approximately 2 times as long as diameter of eye; first segment with white scales at base. Maxillary palpus brown. Basal scales of proboscis pale brown. Antenna brown, with pale yellow scales dorsally.

Thorax. Pale brown dorsally and pale ochreous laterally, and white ventrally. Legs yellowish white.

Wings. Wingspan 34.0 mm. Forewing straw yellow, with sparse ochreous scales; costa white, posterior margin yellow; orbicular stigma dot-shaped, dark brown; reniform stigma crescent, dark brown; fringe blackish brown, with apex white. Hindwing pale yellow.

Abdomen. Brown dorsally and greyish white ventrally.

Male genitalia (Fig. 4). Uncus short and broad, basal width about 2 times of length; apex concaved medially; distally covered with hairs laterally; both sides of ventral surface extending, forming a lamellar structure. Tegumen trapezoid, slightly wider than uncus. Vinculum U-shaped. Saccus triangular. Transtilla triangular, small, ventral process short. Tongue-shaped valva sharply narrow towards rounded apex; costa weakly curved; ventral margin sclerotized in middle and extended a strongly sclerotized, nearly triangular protrusion, ventral surface densely with short spines, with a heavily sclerotized, thick spine inside it; dorsal sella finger-shaped and barely setose, moderately upcurved; sacculus with an indistinct finger-shaped and excurved process in middle. Juxta large, shield-shaped. Phallus slender, vesica with two sclerotized, finger-shaped cornuti in its distal half, covered with tiny teeth.

Female genitalia (Fig. 5). Ovipositor lobes flat, densely setose. Anterior apophysis about 2.5 times length of posterior apophysis. Lamella postvaginalis well developed and strongly sclerotized, densely spinous, composed of a pair of sclerites with anterior part narrow, oval and posterior part broad, wrinkled. Lamella antevaginalis nearly semi-circular. Antrum cup-shaped, short, slightly wider than ductus bursae, sclerotized. Colliculum short, slightly sclerotized. Ductus bursae wrinkled

and spiraled, about 2–3 times length of corpus bursae, with base partly sclerotized. Corpus bursae oval; signum small and narrow, maximal length less than 1/4 of length of corpus bursae, ends bearing carinae approximately acute-angled, other two ends slightly produced.

Material examined. Holotype ♂, China: Qinlangdang Conserve Station, Mt. Gaoligongshan, Yunnan, 27.69°N, 98.27°E, elev. 380 m, 30.V.2017, leg. Teng Kaijian *et al.*, genitalia slide no. ZDD12089 (NKU). Paratype. 1♀, same locality as holotype, 31.V.2017, leg. Teng Kaijian *et al.*, genitalia slide no. ZDD12105 (SYSBM).

Distribution. Yunnan.

Etymology. The specific name derived from the Latin *uni-* and *protrusus*, refers to the single triangular protrusion located on ventral margin of valva in male genitalia.

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References

- Caradja, A. 1925. Ueber Chinas Pyraliden, Tortriciden, Tineiden nebst kurze Betrachtungen, zu denen das Studium dieser Fauna Veranlassung gibt (Eine biogeographische Skizze). *Academia Romana Memoriile Sectiunii Stiintifice*, Series 3, 3(7): 257–383, pls. 1–2.
- Chen, K., Zhang, D.D. 2018. Revision of the genus *Eumorphobotys* with descriptions of two new species (Lepidoptera, Crambidae, Pyraustinae). *Zootaxa*, 4472(3): 489–504. doi: 10.11646/zootaxa.4472.3.4
- Klots, A.B. 1970. Lepidoptera. In: Tuxen, S.L. (ed.), *Taxonomist's Glossary of Genitalia in Insects. Second Revised and Enlarged Edition*. Munksgaard, Copenhagen. pp. 115–130.
- Kristensen, N.P. 2003. Skeleton and muscles: adults. In: Kristensen, N.P. (ed.), *Lepidoptera, Moths and Butterflies. Vol. 2. Evolution, Systematics, and Biogeography. Handbook of Zoology IV (35)*. Walter de Gruyter, Berlin & New York. pp. 39–131.
- Li, H.H., Zheng, Z.M. 1996. Methods and techniques of specimens of Microlepidoptera. *Journal of Shaanxi Normal University, Natural Science Edition*, 24(3): 63–70.
- Maes, K.V.N. 1995. A comparative morphological study of the adult Crambidae (Lepidoptera, Pyraloidea). *Bulletin et Annales de la Société Royale Belge d'Entomologie*, 131: 383–434.
- Munroe, E.G. 1976. Pyraloidea Pyralidae comprising the subfamily Pyraustinae tribe Pyraustini (part). In: Dominick, R.B. *et al.* (eds), *The Moths of America North of Mexico including Greenland. 13.2*. Classey EW Ltd and The Wedge Entomological Research Foundation, London. pp. 1–78, pls. 1–4.
- Munroe, E.G., Mutuura, A. 1969. Contributions to a study of the Pyraustinae (Lepidoptera: Pyralidae) of temperate East Asia V. *The Canadian Entomologist*, 101: 299–305.
- Robinson, G.S. 1976. The preparation of slides of Lepidoptera genitalia with special reference to the Microlepidoptera. *Entomologist's Gazette*, 27: 127–132.