Two new species of Enarmoniini (Lepidoptera: Tortricidae) from eastern Thailand

SOPITA MUADSUB1 & NANTASAK PINKAEW1,2,3

1Department of Entomology, Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, Nakhon Pathom, 73140, Thailand. E-mail: sun_svbee@hotmail.com
2Center for Advanced Studies in Tropical Natural Resources, NRU-KU, Kasetsart University, Chatuchak, Bangkok, 10900, Thailand. E-mail: agrnsp@ku.ac.th
3Corresponding author

Abstract

Two new species of the tribe Enarmoniini (Tortricidae) are described from the Chanthaburi and Trat provinces of eastern Thailand: Helictophanes flava Muadsub and Pinkaew, n. sp., and Cyphophanes khitchakutensis Muadsub and Pinkaew, n. sp. Illustrations of adults and genitalia are provided.

Key words: Cyphophanes, Helictophanes, Enarmoniini, Khao Khitchakut National Park, Olethreutinae, Trat Agroforestry Research and Training Station

Introduction

Although the tortricid fauna of Thailand remains poorly known, considerable progress has been made over the last decade (Pinkaew 2007, 2008, 2011, Pinkaew et al. 2005, Pinkaew & Zhang 2012, Jaikla et al. 2013). The two new species reported in this paper are the result of surveys of olethreutine moths in eastern Thailand during 2011-2012.

Materials and Methods

This study is based on specimens deposited in the Kasetsart Kamphaengsaen Insect Collection (KKIC). Specimens were examined and measured using an Olympus SZ40 stereomicroscope with an ocular micrometer. Forewing length was measured from the outer edge of the tegula at the wing base to the outermost edge of the fringe scales at the apex. Microtrichia, cornuti, and other characters of the genitalia were examined using a Leica DM750 compound microscope. Terminology for forewing pattern and genitalia follows Horak (1991, 2006). Methods of genitalia dissection were adapted from Common (1990). Adults were photographed with a Canon DSLR 5D mark II and 100 mm macro lens. Genitalia were photographed with a Leica DM750 compound microscope with an ICC50 HD camera module, and the photographs were refined using Helicon Focus 5.1 and Photoshop CS3. Holotypes of the two new species are deposited in the Natural History Museum, London (BMNH), and paratypes are deposited in Kasetsart Kamphaengsaen Insect Collection (KKIC) and the Thailand Natural History Museum (TNHM).

Results

Helictophanes Meyrick, 1881

Helictophanes Meyrick, 1881 was proposed with H. iberana Meyrick as the type species. As currently defined
Horak (2006) characterized Helictophanes by the triangular to subrectangular forewing with the costa angled at 3/4 before the apex to evenly curved, and modified male hindwings with a ribbon-shaped process from the base of the anal area. The venation is characterized by a weak basal part of R4 at 3/4 before the apex to evenly curved, and modified male hindwings with a ribbon-shaped process from the base.

**Helictophanes flava** Muadsub and Pinkaew, n. sp.

(Figs. 1A–B, 2A, 2C, 3A, 4A)

**Diagnosis.** This species is characterized by the following features: forewing yellow with a dark triangular dorsal mark and an irregular, curved band from the middle of the costa to the termen; hindwing veins M1 and CuA1 long stalked; male hindwing with a long ribbon-shaped anal lobe nearly reaching the anal angle; and short, nearly straight labial palpi with a small, very short terminal segment. The male genitalia are characterized by a narrow apex of the tegumen with dense scale sockets laterally; and by a valva with a distinct, curved neck and an elongate elliptical cucullus with a very short apical spine. The female genitalia are characterized by a ring-shaped sterigma, incomplete posteriorly; a very short ductus bursae; and a corpus bursae with two large triangular, bladelike signa with elongate hollow bases and a sclerotized plate posteriorly. *H. flava*, n.sp. differs from previously described species of *Helictophanes* by the presence of a sclerite on the posterior area of corpus bursae.

**Description.** Head. Ocellus large, vertex covered with golden yellow scales, upper frons golden yellow, with pale yellow, appressed scales on lower frons; labial palpus rather short (1.5X diameter of eye) (Fig. 2A), porrect, yellow, with brown to dark brown scales dorsobasally on second segment, first segment short, second segment long pale yellow, appressed scales on lower frons; labial palpus rather short (1.5X diameter of eye) (Fig. 2A), porrect, yellow, with brown to dark brown scales dorsobasally on second segment, nearly straight apically with small, single dorsoapical spine; juxta small; caulis rather long; phallus cylindrical, straight, with deep ventral excavation; cucullus long, slender, elliptic to band-shaped, slightly widening beyond neck, rounded apically with small, single dorsoapical spine; juxta small; caulis rather long; phallus cylindrical, straight, moderately long and wide, slightly tapering to apex; with numerous lanceolate cornuti, nearly as long as phallus. Female genitalia (Fig. 4A). Papillae anales with dense setae. Tergum VIII smooth except for lateral triangular extensions with sparse scale sockets; sternum VII weakly sclerotized, moderately scaled, sterigma beyond posterior margin of sternum VII, subcircular ridge, wider laterally, with dense microtrichia around ostium; colliculum small, irregular ring, moderately sclerotized; ductus bursae short and wide, ductus seminalis arising from lobe near bursae neck with elongate and sinuate sclerite on posterior area end of corpus bursae; corpus bursae subovate with two large, unequal signa: triangular blades with long hollow bases.
FIGURE 2. Labial palpi and wing venation. A-B. Labial palpi; A. Helictophanes flava, n. sp. B. Cyphophanes khitchakutensis, n. sp. C-D. Wing venation; C. H. flava, n. sp. D. C. khitchakutensis, n. sp.

Holotype ♂. Thailand: Trat Prov.: Trat Agroforestry R.St., 12°23'43"N 102°40'32"E, ca. 30 m, 12 Oct 2012, N. Pinkaew, np5396 (genitalia slide NP2016). Deposited in BMNH.


Etymology. The specific epithet flava (latin = yellow) refers to the ground color of forewing.

Distribution. Thailand (Trat).

Cyphophanes Meyrick, 1937

Cyphophanes Meyrick, 1937 was proposed with C. dyscheranta Meyrick, 1937 as its type species. Four species are known: C. dyscheranta Meyrick from Indonesia, C. dryocoma (Meyrick) from India, C. gracilivalva (Horak) from Australia, and khitchakutensis Muadsub and Pinkaew, n. sp., from Thailand, described below. The only reported food plant for the genus is Murraya sp. (Rutaceae) for C. dyscheranta (Meyrick 1937).
Horak (2006) characterized Cyphophanes by the subrectangular forewing with a rounded apex, and metallic blue scales with little pattern on a blackish brown ground color. Males of most species have a long, ribbon-shaped process from the base of the anal area of hindwing as in Helictophanes. The forewing venation has R₅ reaching the costa and a strongly oblique cross vein closing the discal cell, and in the hindwing the base of M₂ is distant from...
that of M₃. The male genitalia are characterized by a narrow and high tegumen and a narrow and slender valva with an apical thorn. The female genitalia are characterized by extended lateral-posterior corners of T7, a simple U- to ring-shaped sterigma, two signa, and an additional sclerite at the entrance to the corpus bursae.

**Cyphophanes khitchakutensis Muadsub and Pinkaew, n. sp.** (Figs. 1C–D, 2B, 2D, 3B, 4B)

**Diagnosis.** This species is characterized by a blackish brown forewing with diffuse metallic blue scales and greyish white costal strigulae, by forewing R₅ reaching the apex, by a long ribbon-shaped anal lobe nearly reaching the anal angle in the male hindwing, and by slender, rather short, slightly upcurved labial palpi with a short terminal segment. The male genitalia are characterized by a wide tegumen apex with two lateral lobes with dense scale sockets and by a very slender valva gradually tapering to an apical spine. In the female genitalia the sterigma is small and U-shaped sterigma and is thickening anterior to the ostium, the ductus bursae is long and narrow, and the corpus bursae has two very small, thorn-like signa and a small sclerotized plate in the posterior area. The characters of R₅ reaching the apex in the forewing and the very small signa in the female genitalia distinguish this species from all other known *Cyphophanes*.

**Description:** Head. Ocellus large, vertex, frons, labial palpus and antenna blackish brown; labial palpus rather short (1.5X diameter of eye) (Fig. 2B), porrect to upcurved, second segment upcurved, slender, only slightly widened distally, terminal segment short.

Thorax. Smooth, with raised scale tuft posteriorly, blackish brown, legs unmodified. Forewing length 3.4–3.5 mm in male (n = 2) (Fig. 1C) 4.06 mm in female (n = 1) (Fig. 1D); subrectangular with apex broadly rounded, costa evenly curved, apex broadly rounded, termen sinuate, slightly concave from M₂ to beyond CuA₁; forewing venation with all R veins separate, R₅ reaching to apex, M₁ and CuA₁ diverging from base, then converging at margin (Fig. 2D); ground color blackish brown, with little obvious pattern of blackish patches, with conspicuous spots of bluish metallic scales scattered across wing, with small, white strigulae along costa; underside pale brown with greyish white strigulae on costa. Hindwing with long, ribbon-shaped anal lobe in male, nearly reaching anal angle; venation with M₂ separate from very short-stalked M₃ and CuA₁, 3A reaching to anal margin 1/3 length of 1A+2A (Fig. 2D); brown to dark brown, slightly paler towards base; underside light brown.

Abdomen. Male genitalia (Fig. 3B). Tegumen high, nearly equally wide throughout length, moderately sclerotized, with two laterodistal round lobes with dense, long, hair-like bristles separated by small asetose medial apex; socius membranous, covered with moderately dense scale sockets; gnathos represented by a weak sclerotized band, arising from half length of tegumen; vinculum small; valva simple, slender, sinuate, moderately sclerotized, gradually tapering to downcurved apex with single short spine; juxta small; caulis rather long; phallus moderately long, weakly curved medially, gradually tapering from wide base to pointed apex, without cornuti. Female genitalia (Fig. 4B). Papillae anales with dense setae. Tergum VIII asetose, lateral triangular extensions with a small patch of scale sockets; Tergum VII extending ventrolaterally to behind weakly sclerotized sternum VII, the latter moderately scaled, more densely on posterior margin; sterigma beyond posterior margin of sternum VII, U-shaped, sclerotized ventrally, laterally with small, narrow patch of microtrichia; colliculum slender, long, moderately sclerotized; ductus bursae long, membranous; ductus seminalis arising from anterior end of ductus bursae; corpus bursae subovate, posterior end with small, signum-like sclerites, with two very small, unequal sized, thorn-shaped signa.

**Holotype** ♂. Thailand: Chanthaburi Prov.: Khao Khitchakut N.P., 12°51'04"N 102°12'10"E, ca. 98 m, 14-15 Dec 2012, N. Pinkaew, np5560 (genitalia slide NP1849). Deposited in BMNH.

**Paratypes.** Thailand: Trat Prov.: Trat Agroferestry R.St., 12°23'43"N 102°40'32"E, ca. 30 m, 24–25 Dec 2011, N. Pinkaew (1♂, genitalia slide NP1558), 21–23 Apr 2012 (1♀, genitalia slide NP1650). Deposited in KKIC.

**Etymology.** The specific epithet *khitchakutensis* refers to the name of the type locality Khao Khitchakut National Park.

**Distribution.** Thailand (Chanthaburi and Trat).
Acknowledgements

This research was supported by funds provided by the Kasetsart Research and Development Institute and The Higher Education Research Promotion and National Research University Project of Thailand, Office of Higher Education Commission. We would like to thank for the assistance from personnel of the Khao Kitchakut National Park and Trat Agroforestry Research and Training Station. Sincere thanks also to Dr. Marianne Horak for editorial comments on the manuscript. Two anonymous reviewers provided helpful comment, as well.

Literature cited