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Descriptions of five new species of the family Lecithoceridae from Thailand (Lepidoptera: Gelechioidea)

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Abstract

Five new species of the family Lecithoceridae are described from Thailand: two new species of Torodorinae (*Lepidozonates verberis* Park, sp. n. and *Torodora hispiduana* Park, sp. n.) and three new species of Lecithocerinae (*Lecithocera indanonensis* Park, sp. n., *Lecithocera petalialis* Park, sp. n., and *Opacoptera kerastiodes* Park, sp. n.). In addition, *Eccedoxa lysimopa* (Meyrick, 1933) is reported for the first time from Thailand.
KEY WORDS: Lepidoptera, Gelechioidea, Lecithoceridae, taxonomy, new species, Thailand.

Descripción de cinco nuevas especies adicionales de la familia Lecithoceridae de Tailandia (Lepidoptera: Gelechioidea)

Resumen

Se describen de Tailandia cinco nuevas especies de la familia Lecithoceridae, incluyendo dos nuevas especies de Torodorinae (*Lepidozonates verberis* Park, sp. n. y *Torodora hispiduana* Park, sp. n.) y tres nuevas especies de Lecithocerinae (*Lecithocera indanonensis* Park, sp. n., *Lecithocera petalialis* Park, sp. n. y *Opacoptera kerastiodes* Park, sp. n.). Adicionalmente, se registra por primera vez para Tailandia a *Eccedoxa lysimopa* (Meyrick, 1933).
PALABRAS CLAVE: Lepidoptera, Gelechioidea, Lecithoceridae, taxonomía, nuevas especies, Tailandia.

Introduction

The family Lecithoceridae in Thailand has not been well explored, but it is assumed that the fauna is one of the richest areas in the world. Since PARK (2002) reviewed the genus *Torodora* Meyrick, 1894 of Thailand describing 15 new species, more than 30 species belonging to various genera of the family have been reported, including the review of the genus *Thubana* Walker, 1894 with descriptions of 12 new species (PARK, 2003) and descriptions of two new species of the genus *Lepidozonates* Park, 2013 (PARK *et al*., 2013).

Material and methods

This study is based on the loan material which was collected by Ole Karsholt and his colleagues in 1981 and 1984 in Thailand and preserved in the Zoological Museum, University of Copenhagen, Copenhagen (ZMUC), Denmark. For the new species and the newly reported species from Thailand, images of moths and their genitalia were photographed by the camera, Leica S8APO, with an extension of Leica 10450327 1.0 x mounted by the scientific CMOS (model: Dhyana 400DC). Preparation of the genitalia and the wing slide follows ROBINSON (1976). Wingspan of the species was measured from

the apex of the left wing to the apex of the right wing, and the color standard of adults follows KORNERUP & WANSCHER (1978). All type specimens will be deposited in ZMUC.

Taxonomic accounts

TORODORINAE

***Lepidozonates verberis* Park, sp. n.** (Figs. 1A-G)
http://zoobank.org/act:D72EEC14-4C07-43D7-9335-B63C08C023E8

Type. Holotype: ♂, THAILAND, Chiang Mai, Doi Inthanon Nat. Park, main road, 1900 m, 7-X-1981, Zool. Mus., Copenhagen, gen. slide no. CIS-5859, in ZMUC. Paratypes: 1 ♂, same data as the holotype, gen. slide no. CIS-8114; 1 ♀, same locality and date, gen. slide no. CIS-4802, wing slide no. CIS-5860.

Diagnosis: The new species is superficially very similar to *L. tenebrosellus* Park, 2013 which was described from Thailand and Cambodia (paratype), but it can be distinguished by the male genitalia with cucullus roundly expanded in lower corner and the aedeagus with long, arched cornutus, longer than aedeagus.

Description: Wingspan 18.0-19.0 mm. Head: Dark brown on dorsal surface, orange-white erect scales laterally; frons grayish. Antenna with rather short basal segment, orange white on dorsal and ventral surface; dark brown anteriorly and posteriorly; flagellum orange white throughout, without distinct annulations. Second segment of labial palpus (Fig. 1B) normally thickened; orange white on outer surface; 3rd segment slender as long as 2nd segment, dark brown ventrally. Thorax: Tegula and thorax dark brown. Forewing elongated; ground color uniformly yellowish dark brown, speckled with fuscous scales; discal stigmata invisible; small orange-white costal patch beyond 3/4 of costa; apex obtuse; termen slightly oblique; fringe dark brown, with narrow, orange-white basal line. Hind wing broader than forewing, with a bundle of long hair-like scales at base, grayish white; apex produced; termen sinuate; fringe concolorous, with narrow, yellowish-white basal line; venation with M_2 absent. Abdomen (Fig. 1F): Abdomen with dense spinose zones on dorsal surface; sternite VIII with shortly produced median lobe.

Male genitalia (Figs. 1C-E): Uncus slender, heavily sclerotized, as long as basal plate of gnathos. Gnathos short. Valva expanded anteriorly at base; costa deeply concave before middle; cucullus broadened, roundly expanded around lower corner; densely setose on surface. Juxta helmet-shaped, with round caudal margin and narrow median ridge; latero-caudal lobes absent. Aedeagus slender, curved, tapering toward apex, slightly longer than valva; cornutus single whip-shaped, longer than aedeagus.

Female genitalia (Fig. 1G): Apophyses anteriores longer than half of apophyses posteriores. Abdominal sternite VIII deeply emarginate at middle; signum broadened, about three times wider than length, emarginate on posterior margin medially, with dense strong conic spines.

Distribution: Thailand.

Etymology: The specific name is derived from the Latin, *verber* (= whip), referring to the whip-like cornutus in the male genitalia.

Remarks: The genus *Lepidozonates* Park, 2013 is an Oriental genus, with four known species from Thailand and China including Taiwan. The genus is characterized by having specialized plumose coremata scales along the pleural membrane of the abdominal segments (usually segments IV-VI) in the male. The forewing venation is similar to that of *Torodora* Meyrick, 1894 but the hind wing has M_2 absent.

***Torodora hispiduana* Park, sp. n.** (Figs. 2A-G)
http://zoobank.org/276E57B7-47C9-4FD1-A76C-CD816A35C245

Type. Holotype: ♂, THAILAND, Loei Prov., Phu Luang Wildlife Sanctuary, 700-900 m, 8-14-X-1984, Zool. Mus., Copenhagen, gen. slide no. CIS-8119, wing slide no. CIS-8118, in ZMUC.

Diagnosis: The new species is characterized by the labial palpus with a bristly haired 2nd segment dorsally and the unique forewing venation (Fig. 2C), the forewing with a whitish scale-tuft near middle of cell. The male genitalia are very similar to those of *Torodora flavescens* Gozmány, 1978 but the uncus is elongated with rounded apex and the cucullus is nearly quadrate, truncate on apical margin, whereas in the latter the uncus is broadened apically, concave on caudal margin and the cucullus has rounded outer margin.

Description: Wingspan 12.0 mm. Head: yellowish white dorsally, with erect scales of same color laterally above compound eyes. Antenna longer than forewing, with basal segment elongate, yellowish white, as long as diameter of compound eye; flagellum yellowish white in basal 3/4, without annulations, brownish gray in apical 1/4. Second segment of labial palpus (Fig. 2B) thickened, yellowish brown on outer surface, with hair-like bristly scales above; 3rd segment slender, shorter than 2nd, yellowish white on outer surface. Thorax: Thorax and tegula yellowish white. Hind tibia yellowish white in basal 2/5, yellowish brown beyond on outer surface, with some pale-orange scales on ventral surface apically. Forewing elongate; covered with yellowish brown scales, with short scale-tuft at middle of cell (Fig. 2D, arrow); apex slightly produced; termen concave beyond apex; sinuate; fringe concolorous with ground color, with narrow yellowish-white basal line; venation (Fig. 2C) with R_1 arising from before middle of cell; R_2, R_3, R_4, and R_5 on a common stalk: R_2 stalked with R_{3+4} for basal 1/3; R_3 stalked with R_{4+5} for about basal 3/5; R_4 and R_5 stalked for about basal 4/5; R_5 to termen; M_1 nearly approximate to R_{2+3} at base; M_2 and M_3 short-stalked; CuA_1 and CuA_2 coincident, arising from beyond cell; cell short, closed. Hindwing pale brownish gray, apex produced; venation with M_2 present; M_3 and CuA_1 short-stalked for basal 1/4. Abdomen: Abdomen (Fig. 2G) with broad spinose zones; sternite VIII with triangular protrusion latero-caudally.

Male genitalia (Figs. 2E, F): Uncus elongated, slightly broadened distally, rounded apically. Gnathos strongly bent from 3/5 downward. Tegumen deeply concave on anterior margin. Valva with broad basal part in 1/3 length; costa deeply concave medially; cucullus quadrate with truncate apical margin, dense setose; sacculus broad, terminated before emargination on ventral margin medially. Vinculum narrowly banded. Juxta broad with short, triangular latero-caudal lobes and small median lobe. Aedeagus stout, shorter than valva; dorsal margin nearly straight; ventral margin strongly bent at 1/3; cornuti consisting of a narrow, short bar distally, as long as 1/5 of aedeagus, and a sclerotized plate about 1/3 length of aedeagus basally.

Distribution: Thailand.

Etymology: The specific name is derived from the Latin, *hispidus* (= hairy, bristly), referring to the 2nd segment of labial palpus.

Remarks: The genus *Torodora* Meyrick, 1894 is one of the most diverse genera in the family Lecithoceridae, with about 200 species. The new species has a unique forewing venation with R_2, R_3, R_4 and R_5 on a common stalk, M_2 and M_3 shortly stalked, CuA_2 absent (Fig. 2C) and the labial palpus has rough scales dorsally. Due to these superficial characters, it can be considered to be a new generic assignment as a related genus to *Torodora*, but the male genitalia of this new species are well accordant with those of the genus. Therefore, this species is tentatively placed in *Torodora* here in this paper, until additional species are found, or fresh material is obtained for analysis of the DNA sequence.

Eccedoxa lysimopa (Meyrick, 1933) (Figs. 3A-F)

Cophomantis lysimopa Meyrick, 1933. *Exot. Microl*., **5**: 357. TL: Bombay, India

Eccedoxa lysimopa; Gozmány, 1973. *Ergebn. ForschungUnternehmens Nepal Himalaya,* **4**(3): 441; 1978. *Microl. Palaearctica*, **5**: 247

Diagnosis: This species is characterized by the antenna shorter than the forewing, the forewing without any distinct markings and somewhat rounded apex; venation with R_5 absent; M_1 remote from and M_{2+3} at base; M_2 entirely merged to M_3; CuA_1 and CuA_2 shortly stalked. The hind wing has M_2

absent. The male genitalia can be distinguished by having a long gnathos; valva elongated, rounded apically; and juxta with triangularly produced latero-caudally. Abdomen (Fig. 3F) with broad spinose zones. Wingspan 16.5 mm.

Male genitalia (Figs. 3C-E): Uncus elongated. Gnathos long, bent pre-apically. Valva broad at base, slightly narrowed to 3/4, dilated distally with rounded apex; juxta cup-shaped, concave on the caudal margin, triangularly produced latero-caudally. Aedeagus stout as long as valva, dorsal surface produced apically; cornuti consisting of two half-moon-shaped plates and a bundle of spines.

Female unknown.

Material examined: 1 ♂, Thailand, Chiang Mai, Doi Indanon Nat. Park, main road, 1,900 m, 7-X-1981, Zool. Museum Copenhagen leg., gen. slide no. CIS-8115.

Distribution: India, Nepal, Thailand (new record).

Remarks: The genus *Eccedoxa* Gozmány, 1973 is one of the less diverse genera, comprising six known species which are mostly distributed in India, Sri Lanka and China (one species is known from Australia). The genus is defined by the forewing venation with M_2 entirely merged to M_3, CuA_1 and CuA_2 stalked and the hind wing with M_2 absent. The holotype is deposited in the Natural History Museum, London, UK.

LECITHOCERINAE

Lecithocera indanonensis **Park, sp. n.** (Figs. 4A-D)

http://zoobank.org:act:E8FCBFBA-5ADB-4844-AB13-D8976D6FAESF

Type. Holotype: ♂, Thailand, Chiang Mai, Doi Indanon Nat. Park, 2200-2500 m, 22-23-X-1984, Karsholt, Lomholdt & Nielsen, leg., Zool. Mus., Copenhagen, gen. slide no. CIS-8120, in ZMUC.

Diagnosis: The male genitalia of the new species are similar to those of *L. raphidica* Gozmány, 1978 with conic spines along the ventral margin of the cucullus and with strong median process of the juxta, but can be distinguished by the tegumen deeply emarginated on anterior margin, the juxta with a heavily sclerotized, long, strong caudal process medially, and the aedeagus stouter, with variously shaped cornuti.

Description: Wingspan 18.0 mm. Head: Yellowish brown dorsally. Antenna as long as forewing, basal segment elongated, slightly dilated distally, creamy white on dorsal surface, brownish anteriorly and posteriorly, flagellum creamy white, without annulations. Labial palpus (Fig. 4B) thickened, pale yellowish brown on outer surface, 3rd segment as long as 2nd segment, creamy white dorsally, dark brown ventrally. Thorax: Tegula and thorax yellowish brown. Forewing elongated, slightly dilated distally; ground color pale yellowish-brown; discal spot at middle smaller than spot at end of cell apex obtuse; termen oblique; fringe concolorous with ground color, with yellowish-white basal line; venation with R_3 stalked with R_{4+5} for basal 1/3; R_4 and R_5 stalked for basal 2/3; R_5 to termen; M_1 remote from R_{3+4} at base; M_2 and M_3 nearly parallel; M_3 free, CuA_1 and CuA_2 short-stalked. Hind wing pale grayish, with a bundle of long hair-pencils at base; venation with M_2 present, close to M_3 at base; M_3 and CuA_1 stalked for basal 1/3. Abdomen: Spinose zones absent.

Male genitalia (Figs. 4C, D): Gnathos relatively short, gently bent beyond middle. Tegumen deeply and narrowly emarginated on anterior margin. Valva broad in basal 1/3 with large semi-ovate concavity ventrally; cucullus with conic spines along the ventral margin; the juxta having a large, heavily sclerotized median process. Aedeagus longer than valva.

Distribution: Thailand (Chiang Mai).

Etymology: The specific name is derived from the type locality, Doi Indanon.

Remarks: Although the male genitalia resemble *Homaloxestis* Meyrick, 1910 by having short, conic spines along the ventral margin of the cucullus and by the juxta with a strong median process, which are main diagnostic characteristics of the genus, the presence of the discal stigmata and the

veins CuA_1 and CuA_2 stalked on the forewing make this new species clear to place in the genus *Lecithocera* Herrich-Schäffer, 1853.

***Lecithocera petalialis* Park, sp. n.** (Figs. 4E, F)
http://zoobank.org/F19-4A77-B300-98894AEFD301

Type. Holotype: ♀, THAILAND, Chiang Mai, Doi Indanon Nat. Park, 1,200-1,300 m, 21-24-X-1984, Karsholt, Lomholdt & Nielsen, leg., Zool. Mus., Copenhagen, gen. slide no. CIS-8121, in ZMUC.

Diagnosis: The new species is superficially similar to *L. pelomorpha* Meyrick, 1931. The female genitalia can be distinguished from any known species of the genus by having a long, heavily sclerotized, specifically formed plate in the ductus bursae.

Description: Wingspan, 17.0 mm. Head: Light yellow dorsally. Antenna broken distally; basal segment elongated, dilated distally, light yellow dorsally, brownish ventrally; flagellum light yellow to light orange, without annulations. Second segment of labial palpus thickened, sickle-shaped, light yellow to orange on outer surface, paler on inner surface; 3rd segment slender, pale yellowish brown, as long as 2nd segment. Thorax: Tegula and thorax light yellow dorsally. Hind tibia with light yellow rough scales dorsally. Forewing ground color light yellow to orange, rarely scattered with brownish scales; discal spot at middle small, dark brown and spot at end of cell suffused below; costa straight medially, oblique beyond termination of R_3; apex obtuse; termen slightly sinuate; fringe shiny, pale yellow; venation with R_1 arising from before middle of cell; distance between origin of R_1 and R_2 about 1.5x than that of R_2 and R_3; R_3 and R_4 stalked for basal 1/4; R_4 and R_5 stalked for basal 2/3; M_1 nearly parallel to M_2; CuA_1 and CuA_2 short-stalked. Hind wing pale grayish white, with a bundle of long hair-pencils at base; venation with M_3 and CuA_1 short-stalked. Abdomen: Spinose zones absent.

Female genitalia (Fig. 4F): Abdominal segment VIII weakly sclerotized. Apophyses anteriores slightly longer than 1/2 length of apophyses posteriores. Subgenital plate trapezoidal, weakly sclerotized. Colliculum well-developed. Ductus burase longer than corpus bursae with two long, heavily sclerotized plates in distal 3/5. Corpus bursae ovate; signum ameba-like, transversally elongated, bearing dense conic spines.

Male unknown.

Distribution: Thailand.

Etymology: The specific name is derived from the Latin, *petalum* (= metal plate), referring to the sclerotized plate in ductus bursae of the female genitalia.

***Opacoptera kerastiodes* Park, sp. n.** (Figs. 5A-F)
http://zoobank.org/6519C029-B37D-411F-9D54-9B9574F25608

Type: Holotype: ♂, THAILAND, Chiang Mai, Doi Chiang Dao, 1,130 m, 18-X-1984, Karsholt, Lomholdt & Nielsen, leg., Zool. Mus., Copenhagen, gen. slide no. CIS-8116, in ZMUC.

Diagnosis: This new species is superficially similar to *Opacoptera ecblasta* Wu, 1996 described from China (Sichuan), but it is smaller (13.0 mm in *O. ecblasta*). The male genitalia are also similar, but can be distinguished by the following: sacculus with a spine-like apical process (a digitate process in *O. ecblasta*); latero-caudal process of the juxta more or less horn-shaped, longer than juxta, sharply pointed apically, directed dorsad, without median spine (in *O. ecblasta* shorter with median spine); cornuti of the aedeagus more than 10 with similar length of strong spines (in *O. ecblasta,* differently sized spines).

Description: Wingspan 11.0 mm. Head: Shiny, yellowish brown dorsally. Antenna slightly longer than forewing; basal segment elongated broadened distally, orange white; flagellum orange white in basal 3/5, then shiny yellowish white beyond, without annulations. Second segment of labial palpus (Fig. 5B) thickened, slightly arched, orange white on dorsal surface; 3rd segment slender, as

long as 2nd segment, dark brown ventrally. Thorax: Thorax and tegula yellowish brown. Hind tibia with yellowish-white rough scales dorsally in basal 2/3, orange-gray scales in distal 1/3. Forewing yellowish brown, scattered with dark-brown scales evenly; costa nearly straight; apex obtuse; termen oblique; fringe concolorous with ground color; venation (Fig. 5C) with R_3 free; R_3 and R_4 stalked beyond middle; R_5 to termen; M_1 remote from R_{4+5}; M_2 nearly parallel to M_1; M_3 closer to M_2 than CuA_{1+2} at base; CuA_1 and CuA_2 very short-stalked (CuA_1 and CuA_2 free in the type species); CuA_2 strongly bent basally. Hind wing gray; apex acute; venation with Rs and M_1 long-stalked, M_2 present; M_3 and CuA_1 coincident; CuP presented in distal 1/4. Abdomen (Fig. 5F): rare spines on spinose zones.

Male genitalia (Figs. 5D, E): Uncus short, triangular. Gnathos with rather short, median process. Tegumen with long, bar-shaped basal processes, directed inwardly. Valva with nearly straight costal band; basal part broad basally, triangular; cucullus more or less clavate with round apex, directed inwardly; saculus broadly elongated, exceeding to lower corner of cucullus, with apical spine. Juxta shield-shaped, medially produced on anterior margin; latero-caudal processes long, horn-shaped, sharply pointed apically. Vinculum banded with round apex. Aedeagus very stout, as long as valva; cornuti consisting of more than 10 strong spines of similar length.

Female unknown.

Distribution: Thailand (Chiang Mai).

Remarks: The genus *Opacoptera* Gozmány, 1978 is restricted to China, with two known species: *O. callirrhabda* (Meyrick, 1936) and *O. ecblasta* Wu, 1996 so far. The genus is defined by the forewing venation with all veins free except R_4 and R_5 stalked, (the new species with CuA_1 and CuA_2 short-stalked: considered to be an infraspecific variation); the male genitalia with usually narrowly elongated valva, rounded in apical part.

Etymology: The specific name is derived from the Greek, - *κεράς* (= horn), referring to the horn-like processes of the juxta in the male genitalia.

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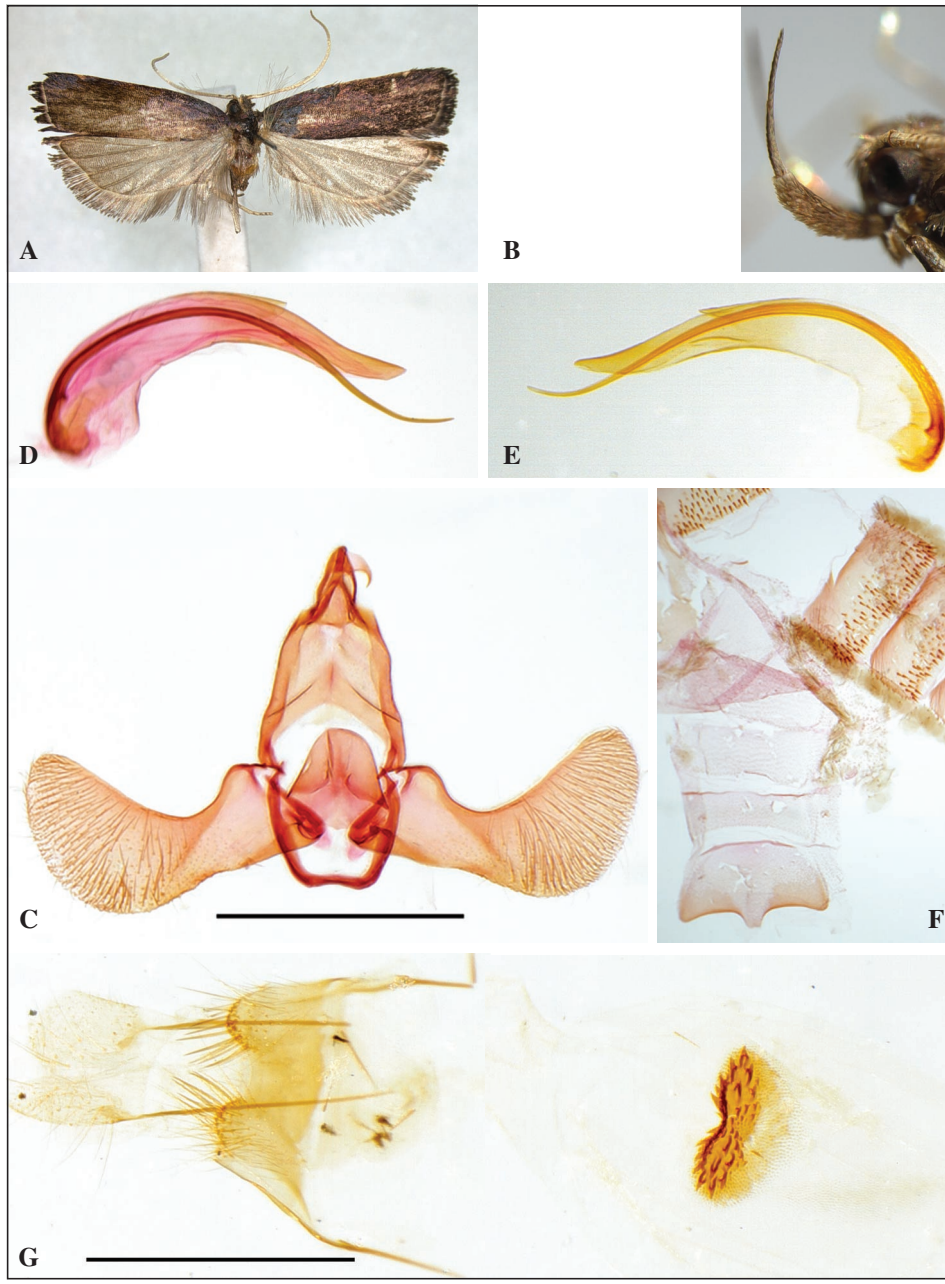

Figure 1.– *Lepidozonates verberis* Park, sp. n.: **A.** holotype; **B.** ditto, labial palpus; **C.** male genitalia, holotype, gen. slide no. CIS-5859; **D.** ditto, aedeagus; **E.** aedeagus of a paratype; **F.** abdomen; **G.** female genitalia, gen. slide no. CIS-4802. Scale bar for the genitalia and aedeagus: 1 mm.

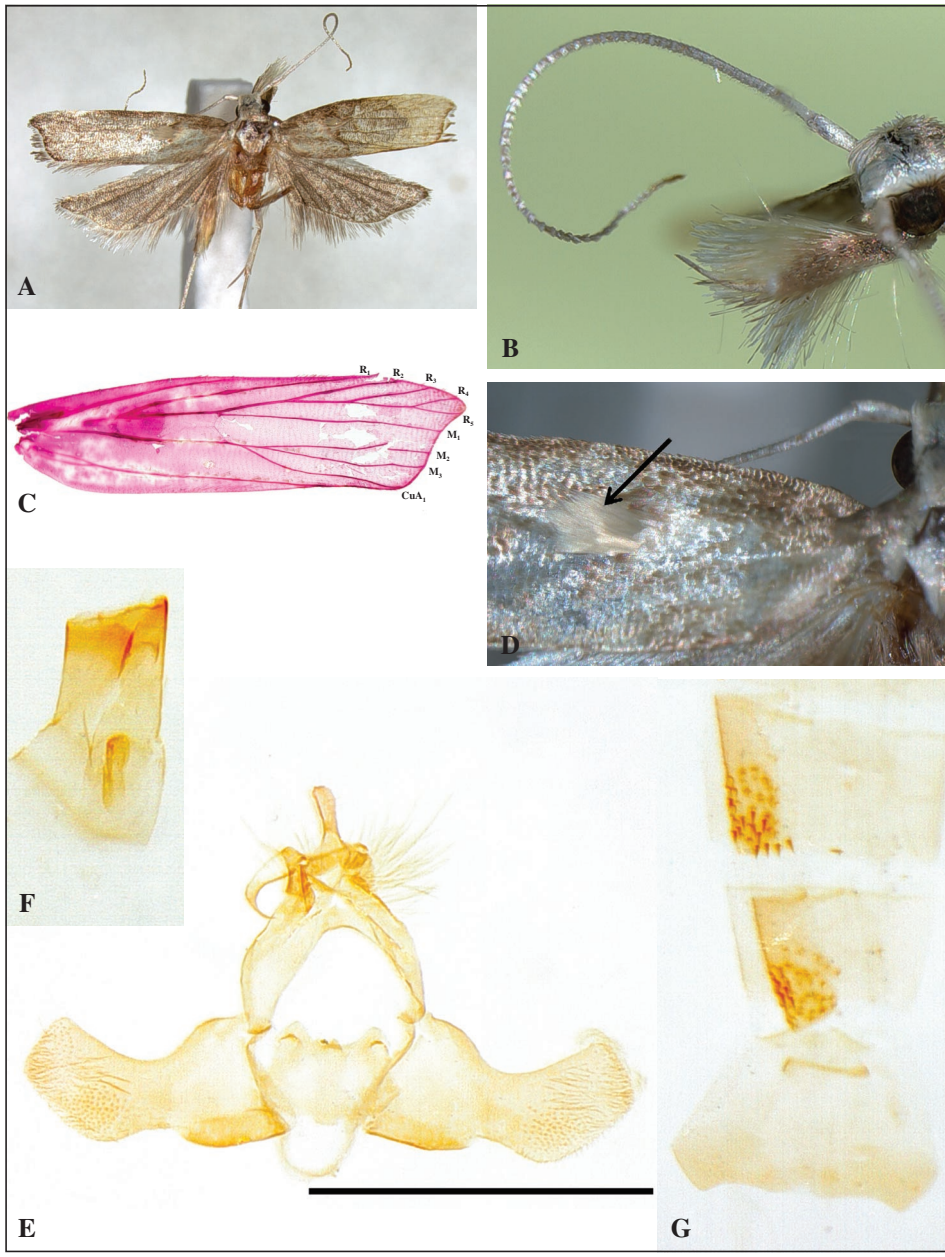

Figure 2.– *Torodora hispiduana* Park, sp. n.: **A.** holotype; **B.** ditto, antenna and labial palpus; **C.** venation of the forewing, wing slide no. CIS-8118; **D.** left forewing with scale tuft; **E.** male genitalia, holotype, gen. slide no. CIS-8119; **F.** ditto, aedeagus; **G.** abdominal segments VI-VIII with spinous zones. Scale bar for the genitalia and aedeagus: 1 mm.

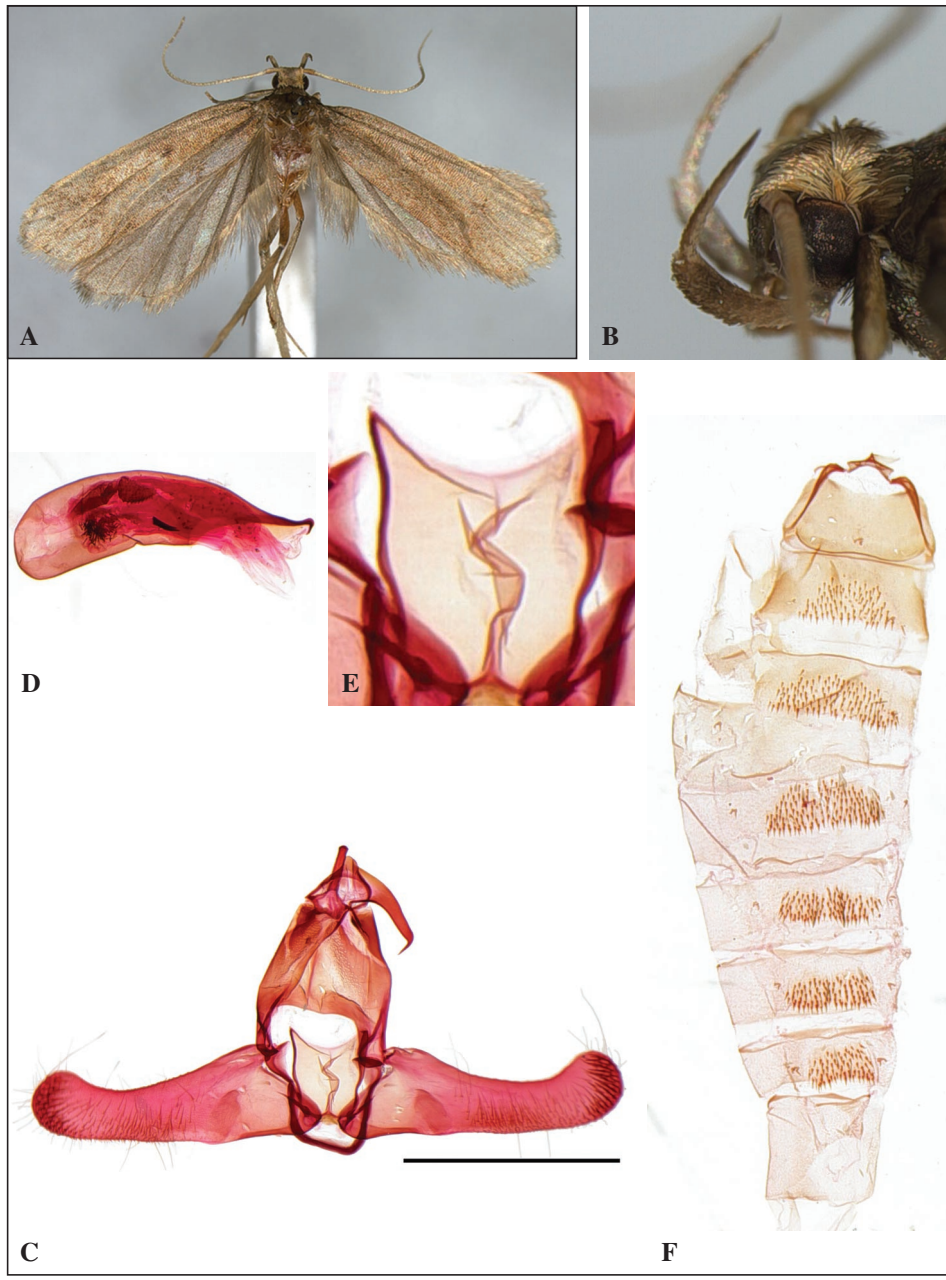

Figure 3.– *Eccedoxa lysimopa* (Meyrick, 1933): **A.** adult; **B.** ditto, head with labial palpus; **C.** male genitalia, gen. slide no. CIS-8115; **D.** ditto, aedeagus; **E.** close-up juxta; **F.** abdomen. Scale bar for the genitalia and aedeagus: 1 mm.

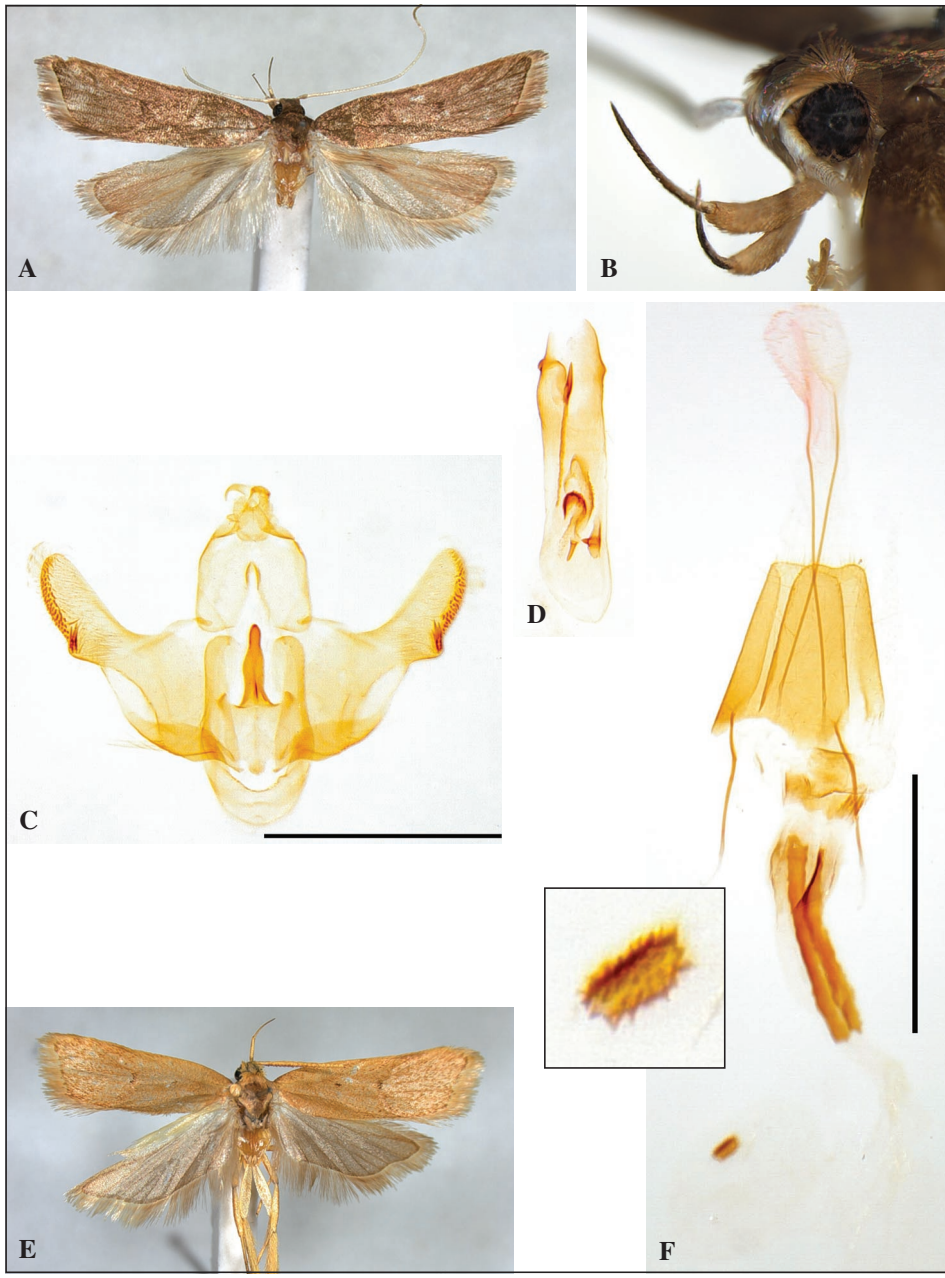

Figure 4.– *Lecithocera indanonensis* Park, sp. n. **(A-D)**: **A.** holotype; **B.** ditto, head & labial palpus; **C.** male genitalia, holotype, gen. slide no. CIS-49; **D.** ditto, aedeagus. *Lecithocera petalialis* Park, sp. n. **(E, F)**: **E.** holotype; **F.** female genitalia, gen. slide no. CIS-8121. Scale bar for the genitalia and aedeagus: 1 mm.

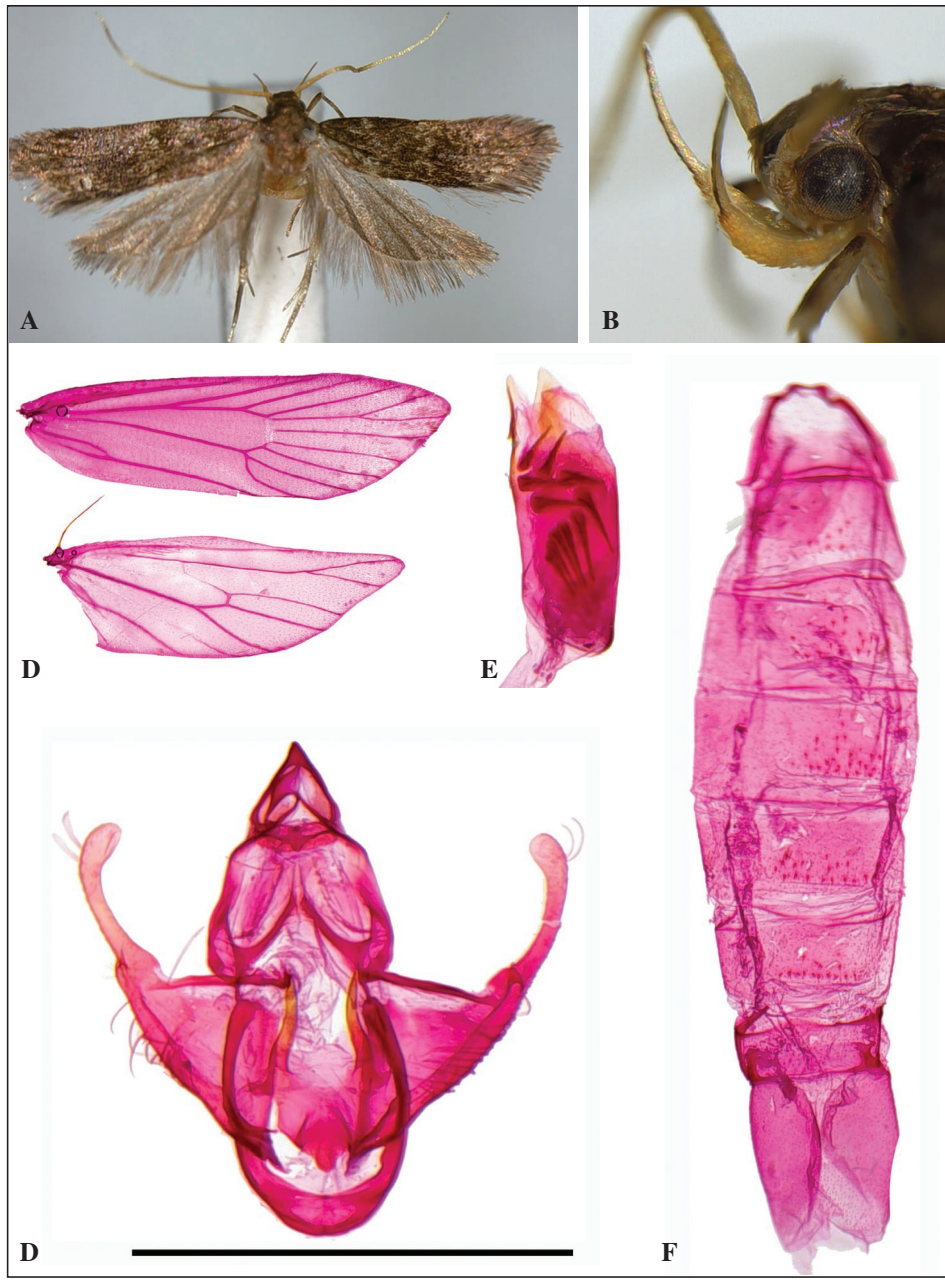

Figure 5.– *Opacoptera kerastiodes* Park, sp. n.: **A.** holotype; **B.** ditto, head and labial palpus; **C.** venation. **D.** male genitalia, holotype, gen. slide no. CIS-8116; **E.** ditto, aedeagus; **F.** abdomen. Scale bar for the genitalia and aedeagus: 1 mm.