

***Debaratania* Pinkaew (Lepidoptera: Tortricidae: Olethreutinae), A New Gorgeous Genus from Thailand with Description of Its Type Species**

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ABSTRACT.— *Debaratania* gen. nov. is described from Thailand, with *Debaratania bellula* sp. nov. designated as the type species. The new genus is characterized by its colorful forewing pattern, sexual dimorphism in the shape of both the fore- and the hindwing, and distinctive male hindwing venation, where M_3 and CuA_1 are short-stalked both proximally and distally, with three distinct anal veins. The male genitalia feature a prominent leaf-like uncus and a large tubular phallus with long, narrow cornuti. In the female genitalia, a conspicuous sclerotized plate with a strongly developed thorn-like process is present at the anterior end of ductus bursae. Living and pinned specimens, wing venation, and genitalia are illustrated. Structural features support placement in the tribe Enarmoniini.

KEYWORDS: Enarmoniini, taxonomy, national park, wildlife sanctuary

INTRODUCTION

A survey of olethreutine moth diversity in Thailand was conducted in Khao Khitchakut National Park, Chanthaburi Province in 2012–2013, Khao Yai National Park, Nakhon Nayok Province in 2016, Phu Wua Wildlife Sanctuary, Bueng Kan Province in 2023, Kaeng Krachan National Park, Phetchaburi Province in 2024 and Phu Pan National Park, Sakon Nakhon Province in 2024. Among the collected specimens, an unusual and previously undescribed taxon was discovered. Based on its wing pattern and genitalia, this taxon belongs to the subfamily Olethreutinae, tribe Enarmoniini. This new genus is named in honor of Princess Maha Chakri Sirindhorn.

MATERIALS AND METHODS

Specimens of the new genus and species were collected in Khao Khitchakut National Park, Khao Yai National Park, Kaeng Krachan National Park, Phu Phan National Park and Phu Wua Wildlife Sanctuary, Thailand using a mercury vapor 500W lamp. They are deposited in Kasetsart Kamphaeng Sean Insect Collection (KKIC), Nakhon Pathom, Thailand and National Museum of Natural History, Smithsonian Institution, Washington DC, U.S.A (NMNH). Latitude, longitude, and elevation were recorded with a GARMIN GPSMAP 76CS. Methods of genitalia dissection and preparation were adapted from Common (1990). Adults were photographed with a Canon DSLR 5D Mark II camera and a MP-E65 macro lens. Labial palpi were photographed with a Leica S8APO stereomicroscope equipped with a Leica MC170HD camera module. A Leica DM750 microscope connected to an

ICC50HD camera module was used for all photographs and examinations of genitalia. An Olympus SZ51 stereomicroscope was used for examinations and measurements of adults. 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. Images were edited in Adobe Photoshop CC. Terminology for forewing pattern elements follows Brown and Powell (1991) as refined by Baixeras (2002). Terminology for genital structures follows Horak (1991, 2006).

RESULTS

Taxonomy

Family Tortricidae Latreille, 1803

Subfamily Olethreutinae Walsingham, 1895

Tribe Enarmoniini Diakonoff, 1953

Genus *Debaratania* gen. nov.

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(Figs 1–8)

Type species.— *Debaratania bellula* Pinkaew sp. nov.

Etymology.— The generic name “*Debaratania*” is a part of name for Her Royal Princess Highness Princess Maha Chakri Sirindhorn.

Diagnosis.— This new genus is superficially similar to some brightly colored species of *Thaumatographa* (Hilarographini), and *Anthozela* (Enarmoniini). However, it is easily distinguished by the sexual dimorphism in the shape of the forewing and hindwing, with the male forewing slightly more subtriangular

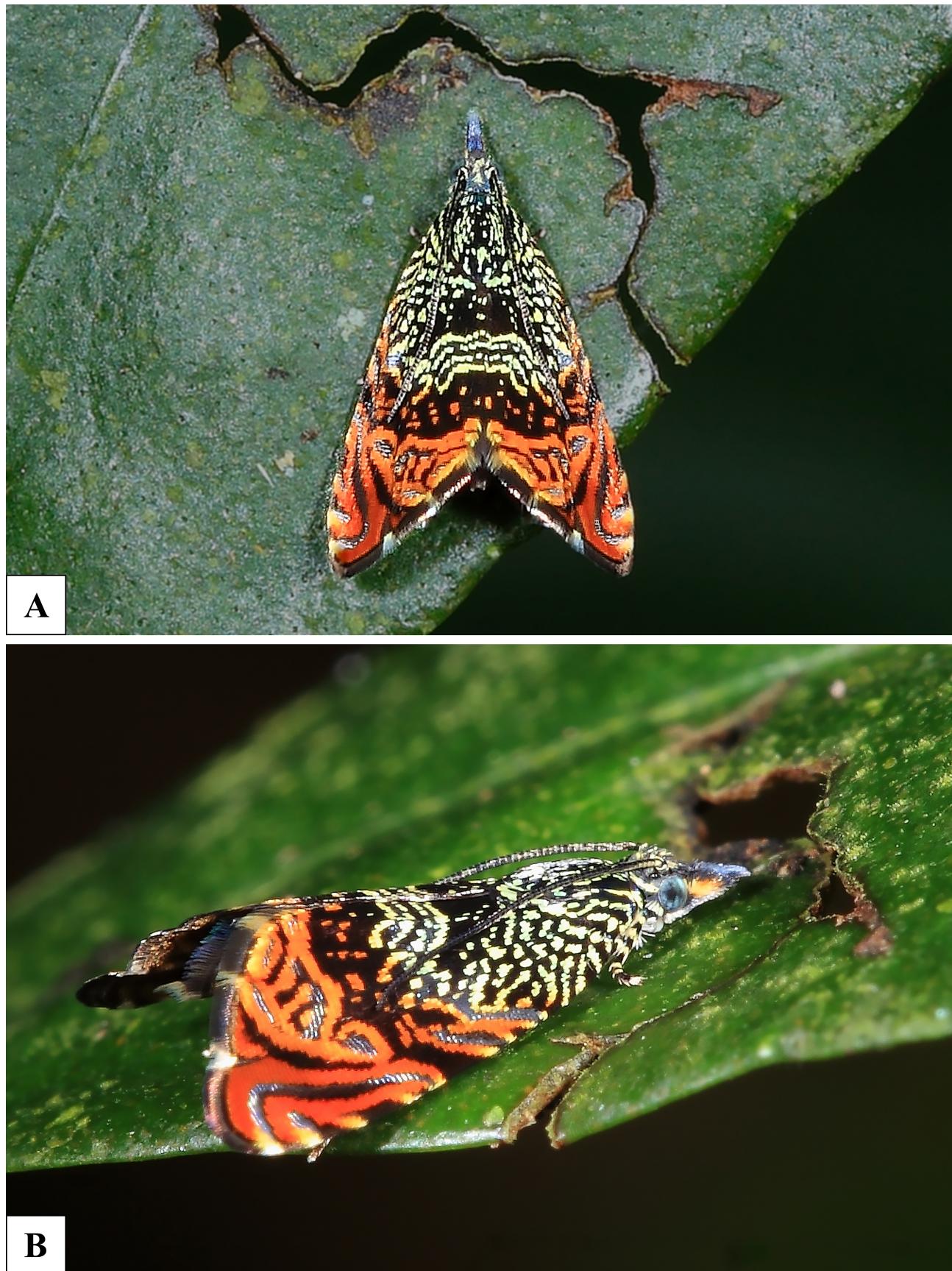


FIGURE 1. Living specimens of *Debaratania bellula* sp. nov. (holotype). **A.** dorsal view. **B.** lateral view

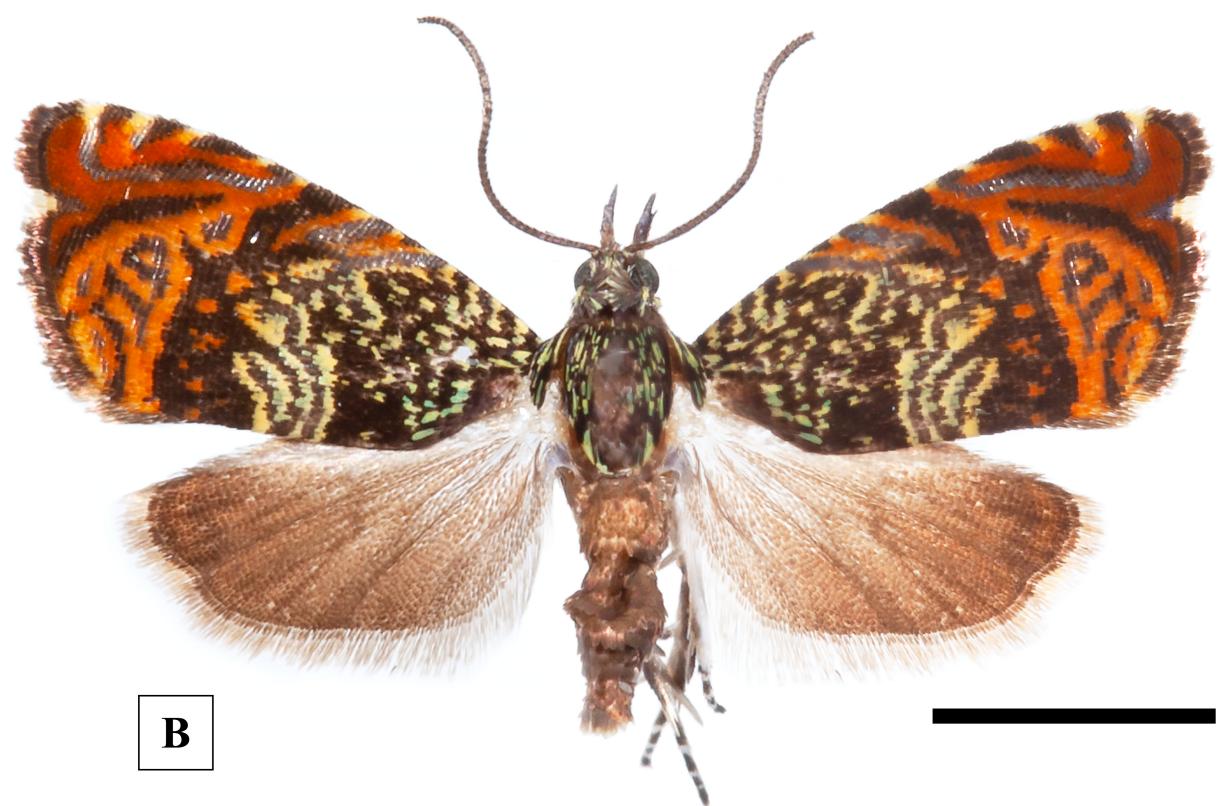
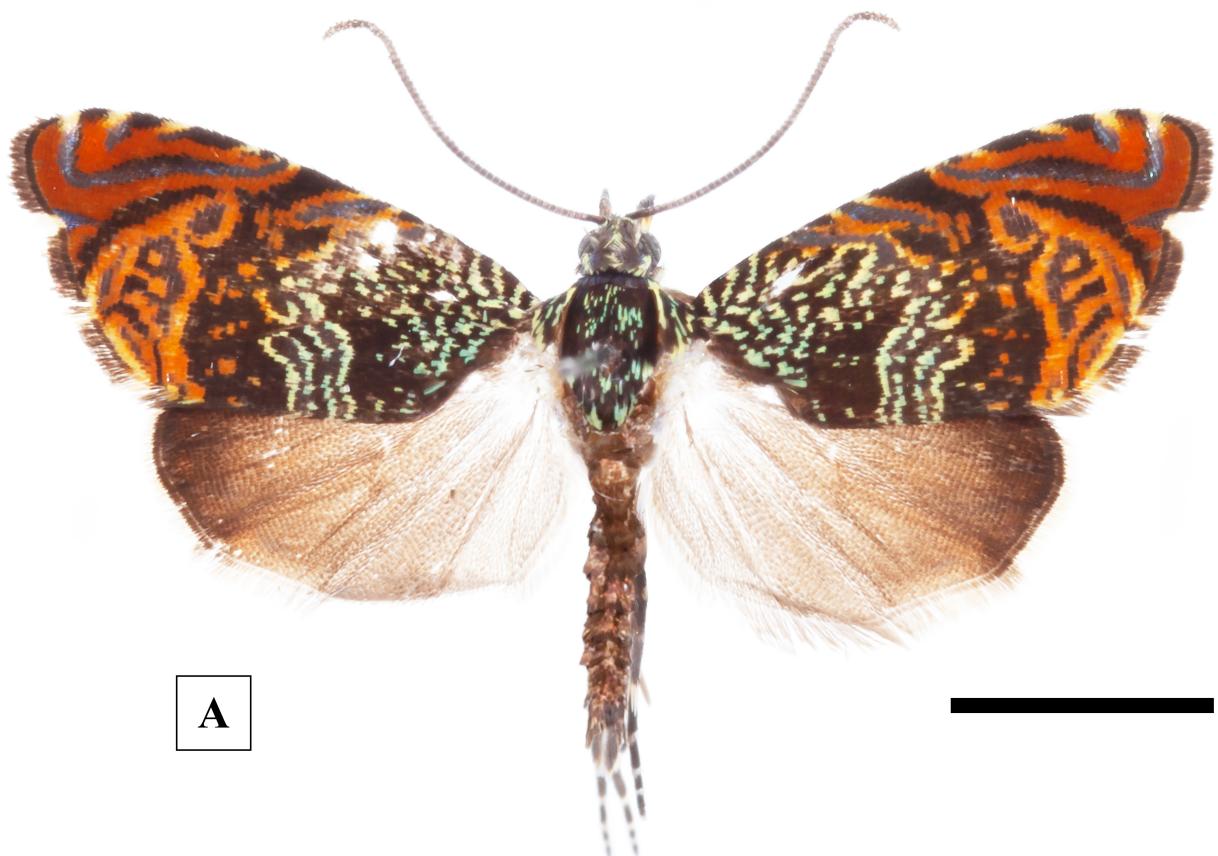


FIGURE 2. Adults of *Debaratania bellula* sp. nov. (scale bars = 2 mm). **A.** male adult, holotype. **B.** female adult, paratype (np5520).

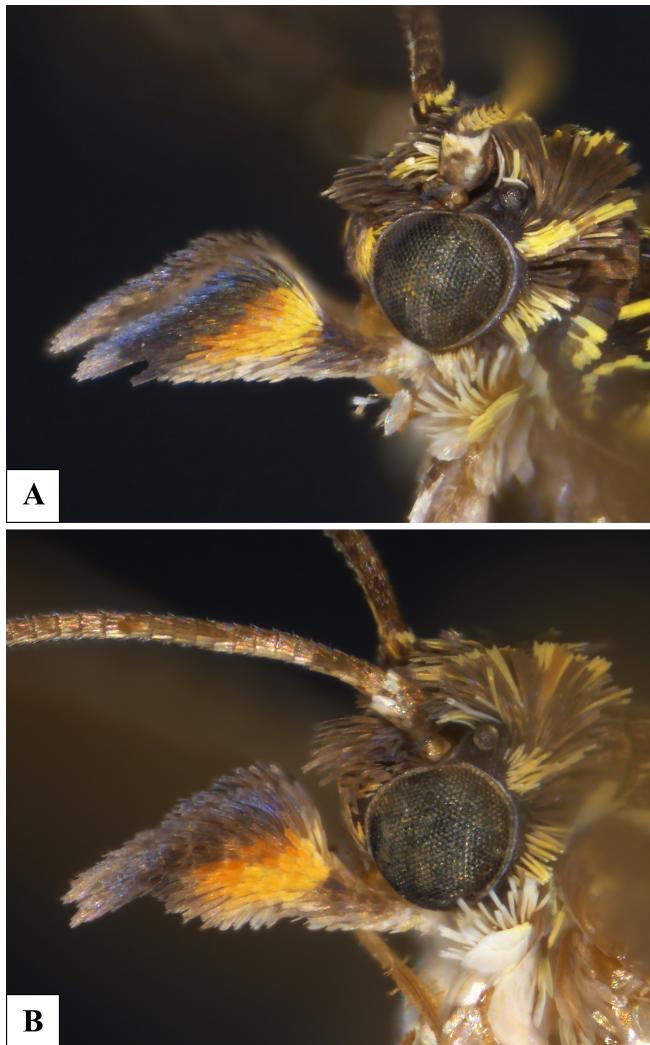


FIGURE 3. Labial palpi of *Debaratania bellula* sp. nov. **A.** male, holotype. **B.** female, paratype (np5530).

than that of the female; the male hindwing larger and rounder than that of the female; the male hindwing with M_3 and CuA_1 fused and short-stalked basally and distally, and the male hindwing with three anal veins that are not present in the female. Male genitalia can be distinguished by an ovate or leaf-like uncus with pointed apex and membranous socii with moderately dense setae, simple valvae with a single spine at apex, and large and long tubular phallus with elongate cornuti. The female genitalia are characterized by the sclerotized process at the anterior end of the ductus bursae as in *Anathamna*, *Cyphophanes* and *Pternidora*, but can be distinguished by the simple ostium bursa in a deep excavation of sternum VII, the incomplete ring of the colliculum, a large sclerotized horn-shaped process posteromedially at bursae neck; and two-minute thorn-shaped signa.

Description.—*Head* (Fig. 3): Lower frons yellow with dark brown laterally, upper frons and vertex dark

brown mixed with yellow; antenna dark brown with yellow scales basally; ocelli large; labial palpus porrect, first segment small, yellowish white, second segment enlarge subtriangular, basal 1/3 narrow and apical 2/3 abruptly widened towards apex, dark brown with a large transverse band medial 1/3, yellow mixed with orange, apical segment long and slender, dark brown, slightly paler apically.

Thorax: Pronotal collar, mesonotum, and tegulae dark brown mixed with diffuse, irregular longitudinal scales, greenish yellow. Forewing subtriangular especially in male (Figs 1, 2A, 4A), arrow-like in top view of resting posture (Fig. 1), less subtriangular in female (Figs 2B, 4B), length 9.0–9.1 mm in males (n=18) (Fig. 2A), 8.1–8.3 mm in female (n=5) (Fig. 2B); costal margin slightly and evenly curved, more curve distally near apex, distinctly in male; termen more oblique in male than female, slightly concave below apex between M_1 and M_3 ; base of M_2 closer to M_3 than M_1 (more conspicuous in male) (Fig. 4); strigulae 1–3 paired, yellowish white, separated by dark brown streaks, strigulae 4–9 single, alternating with dark brown marks; ground color dark brown, basal 1/3 with scattered and irregular, short transverse lines and spots, greenish yellow in male but paler in female, strigula 3 with a short striae, orange, extending obliquely to M_1 , strigula 4 with a moderately long, slightly curve striae, orange, extending obliquely to between base of R_2 and R_3 , continue with disjunct, irregular spots, orange extending obliquely to dorsum before tornus, from strigulae 5–9 with orange ground color, slightly darker towards near costa, inner margin extending curve from near middle of costa to dorsum before tornus, between strigulae 5 and 6 with a silvery striae, extending outwards, slightly sinuate to between R_5 and M_1 near termen, and abruptly bent upwards to strigula 9, strigula 8 connecting with a small silvery spot, with a conspicuous yellowish white spot at termen between M_1 and M_2 , connecting with a small silvery spot inwardly, with a curve band, dark brown, extending from below costa at R_3 to termen between CuA_1 and CuA_2 , ocelloid patch with oblique, irregular stripes mixed with spots, dark brown mixed with silvery scales, dorsum patch with four narrow, curve and sinuate strips, extending from dorsum medially to middle of wing; underside light brown, with small white marks along costa and a small white spot at termen between M_1 and M_2 , with scattered, indistinct brownish orange spots near wing apex. Hindwing distinctly dimorphism (Figs 2, 4) light brown, slightly paler towards base, but wing apex dark brown in male, subtriangular in female but more broad and round in male, costa strongly convex basal 1/3 in male but slightly convex near middle in female, termen strongly

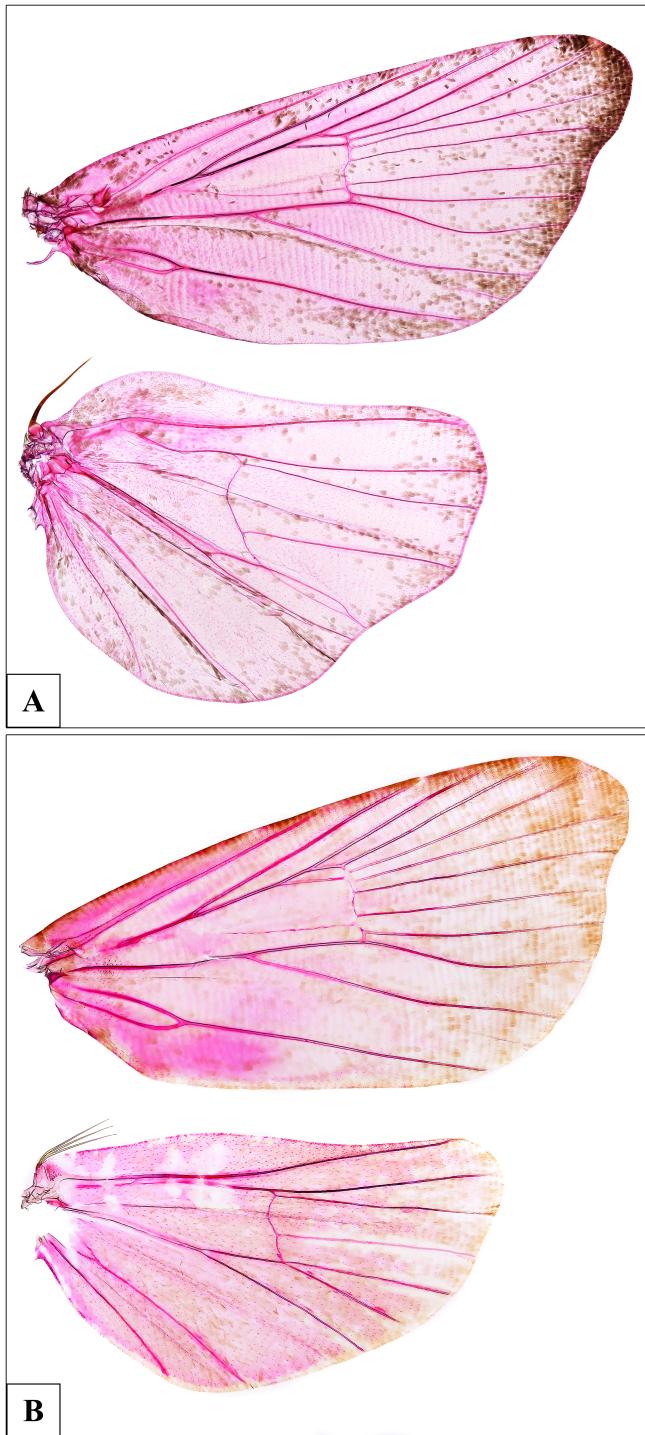


FIGURE 4. Wing venation of *Debaratania bellula* sp. nov. **A.** forewing and hindwing of male, paratype (np5814). **B.** forewing and hindwing of female, paratype (np5520).

sinuate in male than female, anal area more enlarged in male than female, basal 1/2 of Rs stem sinuate in male but slightly convex in female, discal cell in male broader than female, M_2 close to M_3 than M_1 , distance between M_1 and M_2 in male more distant in female, M_2 and M_3 rather parallel in female but strongly separated in male, M_3 close to CuA_1 , fused as very short stalk basally and distally in male (Figs 4A, 5A) but simple

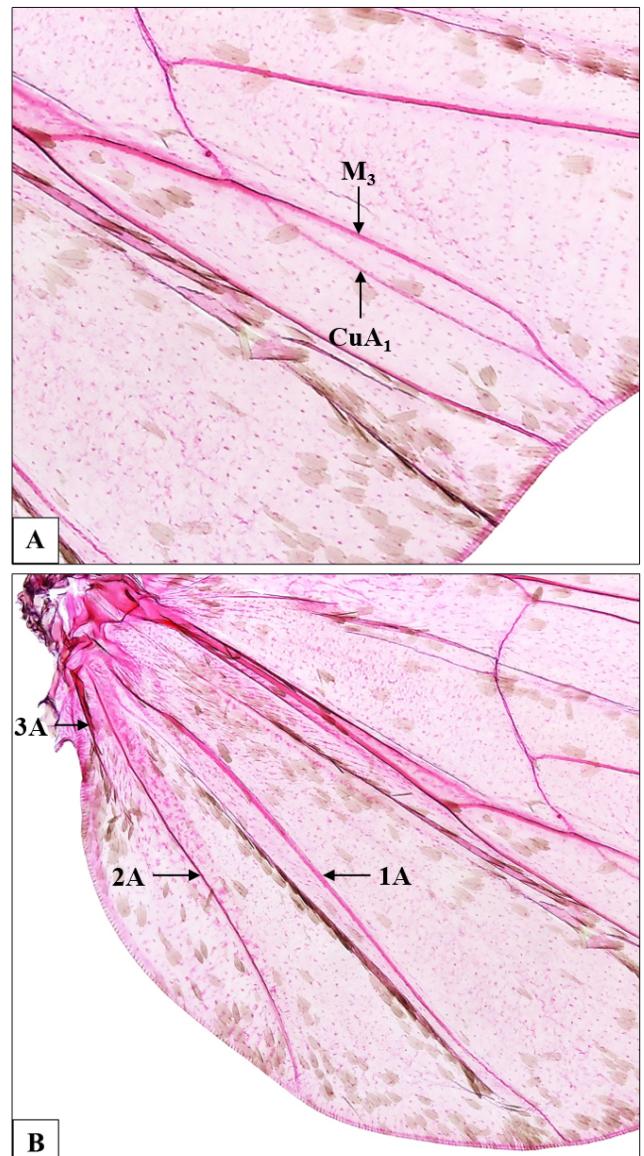


FIGURE 5. Extended part of male hindwing of *Debaratania bellula* sp. nov., paratype, (np5814). **A.** M_3 and CuA_1 with a short basal and distal stalk. **B.** three separate anal veins.

divergent in female (Fig. 4B), CuA_2 slightly curve upward in male but slightly curve downward in female, anal vein in male with three separated veins (Figs 4A, 5B), 3A long 1/3 of 2A, female with fused 1A+2A except basal 1/3, female with three frenulum; underside light brown, slightly paler to wing base, with indistinct brownish orange marks near apex.

Abdomen: Male genitalia (Fig. 6) with moderately high tegumen, subovate, moderately broad, with diffused scale sockets lateromedially; uncus a large, well-developed subovate or broad leaf-like, pointed apex, with dense scale sockets laterally; socii moderately large patch, membranous, with dense, long setae; gnathos arising from apical 1/3 of tegumen,



FIGURE 6. Male genitalia of *Debaratania bellula* sp. nov. (holotype). Scale bar = 0.5 mm.

gnathos membranous transverse bands, slightly sclerotized basally; vinculum moderately wide; juxta subtriangular; caulis moderately long; anellus surrounding basal 1/2 of phallus dorsally; phallus long, moderately wide, tubular-like, moderately curve basally, with 3 long and slender cornuti; valva simple, elongate ovate, dorsal edge forming moderately wide ridge, strongly curve, densely setose, with a rather short apical protruding process and a small thorn at apex, pointing ventrally, large ventral lobe with a patch of dense, long bristles along ventral margin medially, slightly widened towards apically. Female genitalia (Figs 7, 8) with papillae anales moderately broad, densely setose; tergum 8 moderately sclerotized, subtriangular lateral extension with diffuse scale sockets; sternum 7 moderately sclerotized, posterior margin strongly concave medially, 1/4 of length, U-shaped; ostium bursae moderately wide; colliculum narrow and sclerotized, an incomplete ring (Fig. 8A); ductus bursae shorter than corpus bursae, membranous, slightly widened towards corpus bursae, except posterior 1/3 abruptly widened, moderately sclerotized, with a moderately large, strongly sclerotized process, pointing ventrally, straight thorn-like in dorsal view (Figs 7, 8B), curve horn-like in lateral view (Fig. 8C); ductus seminalis arising from posterior 1/3 of ductus bursae; corpus bursae large ovate, with two small thorn-like signa.

***Debaratania bellula* sp. nov.**

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(Figs 1–8)

Material Examined.— Holotype: ♂. THAILAND: Nakhon Nayok Prov., Khao Yai N.P., 14°17'13"N, 101°23'37"E, alt. 400 m, 6 Sep. 2016, leg. N. Pinkaew et al., np9053 (genitalia slide NP3021). Deposited in KKIC. Paratypes: 17♂, 5♀. THAILAND: Chanthaburi Prov., Khao Khitchakut N.P., 12°51'04"N, 102°12'10"E, alt. 98 m, 14–15 Dec. 2012, np5529 (♂), np5530 (♀, genitalia slide NP1836), np5535 (♂, genitalia slide NP1840), np5537 (♂, genitalia slide NP1842), np5539 (♂), np5542 (♂), np5543 (♂), np5561 (♀, genitalia slide NP1848, wing slide); same collection data as preceding, 9–10 Apr. 2013, np5762 (♂), np5763 (♂), same collection data as preceding, 5 Jun. 2013, np5814 (♂, wing slide); same collection data as preceding, 6 Aug. 2013, np5854 (♂); 12°48'37"N, 102°09'11"E, alt. 92 m, 13 Oct. 2012, np5520 (♀, wing slide); same collection data as preceding, 16 Dec. 2012, np5633 (♂), np5642 (♂, genitalia slide NP1892), np5643 (♂, genitalia slide NP1893). Phetchaburi Prov., Kaeng Krachan N.P., 12°44'51"N, 99°28'13"E, alt. 259 m, 8 Apr. 2024, np13957 (♀, genitalia slide NP4207), 12°49'26"N, 99°21'56"E, alt. 974 m, 6 Feb. 2024, np14559 (♂). Bueng Kan Prov., Phu Wua Wildlife Sanctuary, 18°14'45"N, 103°57'41"E, alt. 188 m, 18 Sep. 2023,

np13987 (♂, wing slide), np13989 (♂, genitalia slide NP4208). Sakon Nakhon Prov. Phu Phan N.P., 17°03' 53"N, 103°58'04"E, alt. 315 m, 6–7 Nov. 2024, np13988 (♂). Of these specimens were collected by N. Pinkaew et al. and deposited in KKIC. Two specimens, np5562 (♀, genitalia slide NP1850) and np5563 (♂, genitalia slide NP1851), were collected from Chanthaburi Prov., Khao Khitchakut N.P., 12°51'04"N, 102°12' 10"E, alt. 98 m, 14–15 Dec. 2012, leg. N. Pinkaew and deposited in NMHN.

Etymology.—The specific epithet “*bellula*” means beautiful in Latin, referring to the wing pattern and color of this species.

Diagnosis.—As for genus.

Description.—As for genus.

Remarks.—This new species was collected in three different habitats that occur mostly in the evergreen forest of Khao Khitchakut National Park, the dry evergreen forests of Khao Yai National Park, Kaeng Krachan National Park, Phu Phan National Park and Phu Wua Wildlife Sanctuary. Only one specimen was found in hill evergreen forest of Kaeng Krachan National Park. The species also was encountered in three regions (central, eastern, and northeast) of Thailand and over a wide elevational range 92–974 m.

DISCUSSION

The wing shape and pattern of *Debaratania* gen. nov. superficially resemble those of *Thaumatographa* Walsingham, 1897, from the tribe Hilarographini, subfamily Chlidanotinae. They present the colorful habitus. Mostly *Thaumatographa* species are diurnal in-flight habit (Heppner et al., 2025) but *Debaratania* gen. nov. may possibly nocturnal in-flight habit because all specimens were collected from light sheet at night. Labial palpi of *Thaumatographa* is dorso-ventrally flattened upturned (Heppner et al., 2025) but porrect in *Debaratania* gen. nov. However, the male and female genitalia of *Debaratania* gen. nov. differ from those of *Thaumatographa* while aligning more closely with the structural characteristics of Olethreutinae. The wing pattern of *Debaratania* gen. nov. does not indicate a close relationship with any known genus within Olethreutinae. Both forewings and hindwings exhibit sexual dimorphism. The male hindwing venation represents a unique apomorphy, with M_3 closely approximated to CuA_1 , fused basally and distally to form a short stalk, and three distinct anal veins.



FIGURE 7. Female genitalia of *Debaratania bellula* sp. nov. (paratype, NP1836). Scale bar = 0.2 mm.

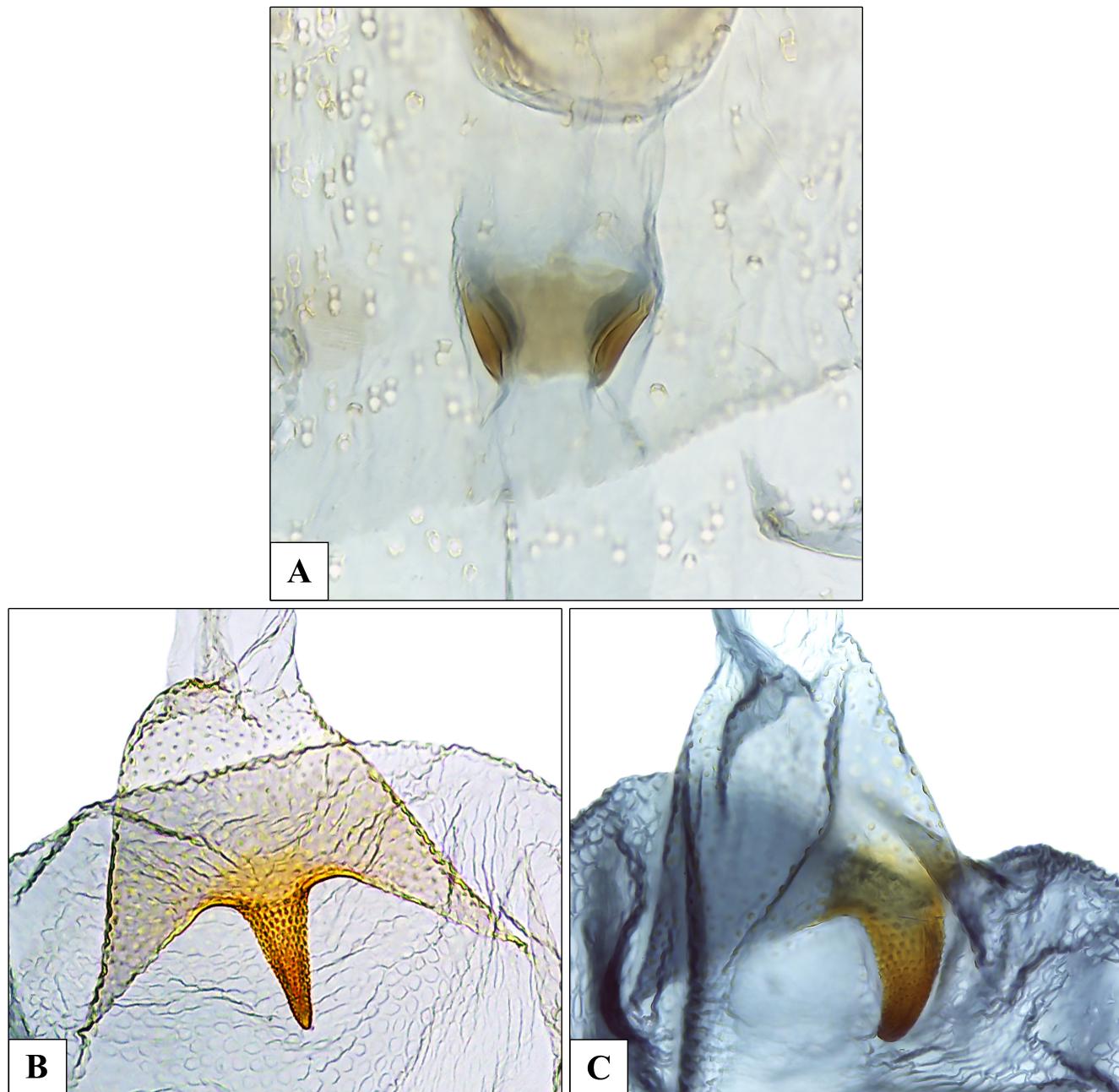


FIGURE 8. Extended part of female genitalia of *Debaratania bellula* sp. nov. **A.** colliculum (paratype, NP4207). **B.** sclerotized plate and sclerotized process at bursae neck (dorsal view) (paratype, NP1836). **C.** sclerotized plate and sclerotized process at bursae neck (lateral view) (paratype, NP4207).

The male genitalia of *Debaratania* gen. nov. exhibit plesiomorphic traits shared with *Anathamna*, *Cyphophanes*, and *Helictophanes*, including simple valvae, a hairy lobed sacculus, and an apical thorn on the cucullus. The female genitalia feature a sclerotized process at the corpus bursae neck, a trait also observed in *Anathamna*, *Cyphophanes*, and *Pternidora*. Given these characteristics, *Debaratania* gen. nov. is tentatively placed in the tribe Enarmoniini. However, its precise phylogenetic position remains uncertain, as

it is highly derived and does not exhibit strong affinities with any particular sister taxon.

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