



A revision of *Episothalma* Swinhoe, 1893, with descriptions of two new species and one new genus (Lepidoptera, Geometridae, Geometrinae)

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Abstract

The genus *Episothalma* Swinhoe is reviewed, and two new species are described: *E. irrobustaria*, **sp. nov.** from Thailand, and *E. cuspidata* **sp. nov.** from Hainan Province, China. *E. ocellata* Swinhoe is excluded from *Episothalma* and *Pseudepisothalma* **gen. nov.** is erected based on this species. A lectotype is designated for *P. ocellata*. Descriptions and diagnoses for both genera are given. All the known species are redescribed, and variations in the male genitalia of *E. robustaria* (Guenée) are described and figured. Illustrations of adults and genitalia are presented.

Key words: Geometrinae, *Episothalma*, taxonomy, new species, new genus, *Pseudepisothalma*

Introduction

The genus *Episothalma*, a small genus within Geometrinae, was erected by Swinhoe, 1893, based on *Thalassodes sisunaga* Walker, 1861 from India, which is a junior synonym of *E. robustaria* (Guenée, 1858). Prout (1912) listed five species under this genus name, including *E. robustaria*, *E. ocellata* Swinhoe, 1893, *E. cognataria* Swinhoe, 1903, *E. obscurata* Warren, 1896 and *E. subaurata* Warren, 1899. Prout (1917) added a sixth species, *E. sequestrata* Prout, 1917 to this genus, and Prout (1933) followed this concept. Holloway (1996) moved *subaurata*, *obscurata* and *sequestrata* to the genus *Hemithea* Duponchel. Thus, only three species were listed in *Episothalma* by Scoble (1999): *E. robustaria*, *E. cognataria* and *E. ocellata*. Holloway (1996) gave the diagnostic characters of *Episothalma*, provided the biology of *E. robustaria*, and included *Episothalma* in the worldwide tribe Hemitheini (=Hemitheiti). More than 40 genera are currently placed in this tribe following studies by Inoue (1961), Ferguson (1985), Pitkin (1996), Viidalepp (1996), Hausmann (1996) and Holloway (1996), and the genera in the tribe share the following characters: the socii and uncus are more or less equivalent in size, the former never less than half the length of the latter and usually closely appressed with it; veins M₃ and CuA₁ of the hind wing are usually stalked; the male antennae are often strongly bipectinate (Holloway 1996). In the present work, the tribal placement of *Episothalma* follows Holloway's concept.

An examination of a long series of *Episothalma* from different sources revealed that two undescribed species were present, and that *E. ocellata* is not a member of *Episothalma* on the basis of the male genitalia, and does not fit into any known genus. The purposes of this paper are to provide a taxonomic review of *Episothalma* and to erect one new genus.

Materials and methods

Specimens studied were obtained from the following resources: Institute of Zoology, Chinese Academy of Science, Beijing, China (IZCAS); The Natural History Museum, London, UK (BMNH); Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK); Zoologische Staatssammlung, Munich, Germany (ZSM); private collection of Mr. Manfred Sommerer, Munich, Germany (SOMM.M.). Terminology for wing venation follows the Comstock-Needham System (Comstock 1918) and Hausmann (2001), and that of the genitalia is based on Pierce (1914), Klots (1970) and Nichols (1989). Digital images were enhanced and plates compiled using Adobe Photoshop software.

Episothalma Swinhoe, 1893

Episothalma Swinhoe, 1893a, *Ann. Mag. Nat. Hist.* (6) 12: 149. Type species: *Thalassodes sisunaga* Walker, 1861, by original designation. [INDIA]: Hindostan.

Episthophthalma Hampson, 1895, *Fauna Br. India* (Moths) 3: 483. [Emendation of *Episothalma*.]

Redescription. Head: Antenna ciliate in male, filiform in female. Frons moderately protruding, smooth-scaled. Labial palpus short, third segment in female elongate. Thorax: Hind tibia with one pair of terminal spurs in male and two pairs of spurs in female. Wing pattern: Outer margin of both wings wavy, lightly concave under forewing apex and deeply concave between M_1 and M_3 on hind wing; inner margin on hind wing elongate. Transverse lines on both wings distinct or indistinct; forewing with antemedial line slightly wavy; both wings with postmedial lines slightly dentate; discal spots dark brown or black dot on both sides. Both wings with ventral side much paler than dorsum; postmedial line distinct. Venation: Frenulum developed. Forewing: Vein R_1 free; $R_{2,5}$ and M_1 diverging from the anterior angle of cell; R_2 diverging before R_3 ; M_3 and CuA_1 from the posterior angle of cell. Hind wing: R_s longly stalked with M_1 ; M_3 and CuA_1 stalked or both from the posterior angle of cell; 3A absent. Abdomen: Dorsal crests present. Sternite 3 in male without setal patch. Male genitalia: Uncus developed, tapered or blunt at apex. Socii weak, usually shorter than uncus. Gnathos with lateral arms not joined at middle. Valva with apex rounded, setose; a longitudinal, irregularly wrinkled ridge with dense hair present in central part; a tapered, fairly sclerotized fold or hook present in the center, posterior to which there is a small lobe or a large dentate process. Transtilla a large sclerotized plate. Juxta a slightly to moderately sclerotized plate, posterior margin arched to reversed U-shape. Saccus not protruding, vinculum developed. Coremata fairly developed. Aedeagus moderately slender, broad and sclerotized posteriorly, manica often with sclerotized process, sometimes vesica sclerotized and wrinkled. Female genitalia: Apophyses anteriores very short. Lamella postvaginalis a small and rounded plate. Ductus bursae broad and fairly long, sclerotized. Corpus bursae moderately large, membranous, wrinkled, with a bicornute signum.

Diagnosis. The genus *Episothalma* looks superficially similar to *Euxena* Warren, 1896, a member of the Aracimini, on wing patterns, but can be differentiated easily on external features. The main differences are as follows: *Episothalma* has a much smaller discal spot on the dorsal side and paler markings on the ventral side, but *Euxena* has a much larger discal spot on the dorsal side and stronger markings on the ventral side; the male hind tibia has only one pair of terminal spurs in *Episothalma*, while there are two pairs of spurs in *Euxena*; the paired setal patches of sternite 3 in the male are absent in *Episothalma* but present in *Euxena*. As a member of the Hemitheini, *Episothalma* is different from *Euxena* in the male genitalia: for example, the socii of *Euxena* are triangular and broader, while those of *Episothalma* are tapering or with small lobes proximately; coremata are developed in *Episothalma* but absent in *Euxena*. In the male genitalia, *Episothalma* is distinctive in the tribe Hemitheini in having a tapered, fairly sclerotized fold or hook in the center of the valva.

Distribution. Oriental region, including China, Vietnam, India, Myanmar, Nepal, Thailand, Malaysia (West and East), Indonesia (Java, Sumatra, Kalimantan).

Key to *Episothalma* species, based on male genitalia

1. The transverse sclerotized band on valva extending to ventral margin, bearing a series of spines 2
The transverse sclerotized band on valva without spines or not present 3
2. The posterior end of the transverse band rounded and blunt *E. cognataria*
The posterior end of the transverse band pointed *E. cuspidata* **sp. nov.**
3. Uncus blunt; valva with the small sclerotized lobe close to ventral margin, and the area anterior to the lobe unmodified *E. robustaria*
Uncus tapering; valva with the small sclerotized lobe further from ventral margin, and the area anterior to the lobe sclerotized and extending to ventral margin *E. irrobustaria* **sp. nov.**

Episothalma robustaria (Guenée, 1858)

Figs. 1–5

Hemithea robustaria Guenée, 1858, in Boisduval & Guenée, *Hist. Nat. Insectes* (Spec. gén. Lépid.) 9: 383. Holotype ♀, India (central). (ZFMK) (examined)

Thalassodes sisunaga Walker, 1861, *List Specimens Lepid. Insects Colln. Br. Mus.* 22: 550. Holotype ♀ [♂], Hindostan [India]. (BMNH) (examined)

Thalassodes macruraria Walker, 1863, *List Specimens Lepid. Insects Colln. Br. Mus.* 26: 1561. Syntypes 7♂, 1♀, [Bangladesh]: Silhet [Sylhet]; North Hindostan [India]; Canara [Kanara]. (BMNH) (examined)

Thalassodes fimbriaria Walker, 1869, *Charact. Undescr. Lepid. Heterocera*: 97. Syntype(s) ♂, [India]: near Benares. (BMNH) (examined)

Thalassodes indeterminata Walker, 1869, *Charact. Undescr. Lepid. Heterocera*: 98. Syntype(s) ♂, [India]: near Benares. (BMNH) (examined)

Chlorodontopera (*Episthophthalma*) *robustaria*: Hampson, 1895, *Fauna Br. India* (Moths) 3: 484.

Redescription. Head: Antenna ciliate in male and filiform in female. Frons dark red-brown, smooth-scaled. Labial palpus dark brown, short, not extending beyond frons in male; third segment in female elongate, about one third extending beyond frons. Vertex with anterior half white, posterior half grass green. Thorax: Dorsum grass green. Hind tibia in male with one pair of terminal spurs, in female with two pairs of spurs, very close to each other. Length of forewing: ♂17–20 mm; ♀19–22 mm. Forewing with apex pointed; outer margin under apex concave and forming a small process on vein M_3 ; outer margin of hind wing concave between M_1 and M_3 , forming a process respectively on both veins. Wings ground colour grass green. Forewing with costa orange yellow, diffused with black scales; antemedial line wavy, indistinct, proximately with small white dots on veins. Postmedial lines on both wings yellowish green, dentate irregularly, posteriorly accompanied by small white dots on veins. Discal spot black. Terminal line dark brown. Fringes grayish green to brown. Ventral side pale green; discal spot distinct, black brown; postmedial line indistinct to distinct, dark grass green, sometimes much darker on veins. Abdomen: Dorsum reddish brown mixed with black brown, crested, much darker from second to fourth segment. Male genitalia (Figs. 11–18, 24–29). Uncus sclerotized, tapered, blunt at apex. Socii slightly sclerotized, tapered, broader and shorter than uncus. Gnathos with lateral arms slightly sclerotized and not joined in the middle. Valva long and narrow; terminal half various, narrower or broader than base, rounded, sometimes with a small process; costal margin expanded distinctly or weakly, or almost straight; irregularly wrinkled ridge with dense hair present at center; a pointed sclerotized hook-like tooth present near center, posterior to which is a small lobe. Transtilla a large weakly sclerotized plate, strongly projecting posteriorly, sometimes slightly bilobed at posterior margin. Juxta arced. Saccus not protruding, but vinculum protruding beyond base of valva. Coremata fairly developed. Aedeagus moderately slender, broadened and sclerotized posteriorly, vesica sclerotized and wrinkled, without cornutus; sometimes manica with one to three sclerotized processes. Female genitalia (Fig. 23). Apophyses posteriores about 5 times length of apophyses anteriores. Ostium broad, sclerotized. Lamella postvaginalis nearly rounded; Lamella antevaginalis shallowly concave. Ductus bursae short, slightly sclerotized. Corpus bursae large, about 4 times length of ductus bursae, with a bicornute signum.

Materials examined. INDIA: holotype ♀, Inde, Ex. Musaeo Ach. Guenée (other label: “Typicum Specimen”; “*Hemithea robustaria* Guenée (Sp. t. no. 613)”) (ZFMK); holotype of *sisunaga*, ♂, Hindostan [India] (BMNH); syntype of *fimbriaria* (no other data), 1♂ (BMNH); syntype of *indeterminata* (no other data), 1♂ (BMNH); syntypes of *macruraria* (no other data), 1♂1♀ (BMNH); Khasis, VIII.1895, Nat. Coll., 1♂ (ZFMK); Khasis, Nat. Coll., Ex. Oberthür Coll., Brit. Mus. 1927-3 (with figure label), 1♀ (BMNH); Khasis, VI.1896, Nat. Coll., Ex. Oberthür Coll. Brit. Mus. 1927-3, 2♂ (BMNH); Khasis, Nat. Coll., Ex. Oberthür Coll. Brit. Mus. 1927-3, 1♂1♀ (BMNH); Darjeeling, 79.57, 1♂1♀ (BMNH); Nilgiris, Hampson Coll. 89-129, 1♀ (BMNH); Karwar, IX.1895, 1♂ (BMNH); Chandkhira Silhet, Rothschild Bequest, B.M.1939-1, 1♂ (BMNH); Sikkim, Interior, Möller, Colletio H.J. Elwes, Rothschild Bequest, B.M. 1939-1, 1♀ (BMNH); South India: Nilgais W. Mallapuram, 700 m, 18.VIII. 1987, B. Turlin, 1♂ (ZSM); **CHINA:** Guizhou: Rongjiang; 1♀ (IZCAS); Hainan: Diaoluoshan, 7.V.1984, coll. Wang Chunling, 1♂ (IZCAS); Hainan: U.S.W, April-May, leg. Müller and Li, 5♂ (ZSM); Youboi, Hainan, VI.1904, Rothschild Bequest, B.M.1939-1, 1♂ (BMNH); Tonfu, Hainan, VII.1904, Rothschild Bequest, B.M.1939-1, 1♀ (BMNH); Yunnan: Xishuangbanna Bubeng, 700 m, 14.IX.1993, coll. Cheng Xinyue, 2♂ (IZCAS); ibidem, coll. Yang Longlong, 2♂ (IZCAS); ibidem, coll. Xu Huanli, 1♂ (IZCAS); ibidem, no collector, 1♂ (IZCAS); Yunnan: Xishuangbanna Menglun, 580 m, 13.IX.1993, coll. Cheng Xinyue, 1♂ (IZCAS); Yunnan: Dongwuliangshan, 1320 m, 15.V.1982, 1♂ (IZCAS); Yunnan: Ruili Dengga, 980 m, 6–8.VI.1992, coll. Xue Dayong, 1♀ (IZCAS); Yunnan: Cangyuan, 625 m, 9.VI.1980, 1♀ (IZCAS); Yunnan: Jingdong Wuliangshan, 1320 m, 15.V.1982, 1♂ (IZCAS); Yunnan: Hekou Xiaonanxi, 11.VI.1956, 1♂ (IZCAS); **NEPAL:** Nepal, Buri Gandaki, Machha Khola, 880 m, 30.VI.1998, leg. M. Fibiger, 1♂ (IZCAS, ex. Fibiger Coll.); Nepal, Central, 15 km, S. Barpak, Baluuea, 850 m, 10.VII.1998, leg. M. Fibiger, 1♂ (IZCAS, ex. Fibiger Coll.); **MYANMAR:** Hsipaw, Burma, L.De Niceville, 97-192, III.1897 (length of forewing only 16 mm), 1♀ (BMNH); **VIETNAM:** Vietnam: Forêt de Cuc Phuong, 150 km SE de Hanoi, 21–22.X.1990, L. Schwartz, 1♂ (ZSM); **THAILAND:** Thailand N., 30 km N Mae Hong Son, Karen village, 1100 m, 16.VII.2003, leg. M. Fibiger, 1♂ (IZCAS, ex. Fibiger Coll.); **MALAYSIA** (Borneo): Site 23, April, W. Melinau Gorge, 250 m, 430558, FEG 4. Limestone forest, MV-canopy/understorey, Sarawak, Gunong Mulu Nat. Park, R.G.S. Exped. 1977-8, J.D. Holloway *et al.* B.M. 1978-206 (Geometridae genitalia slide NO. 8467), 1♂ (BMNH).

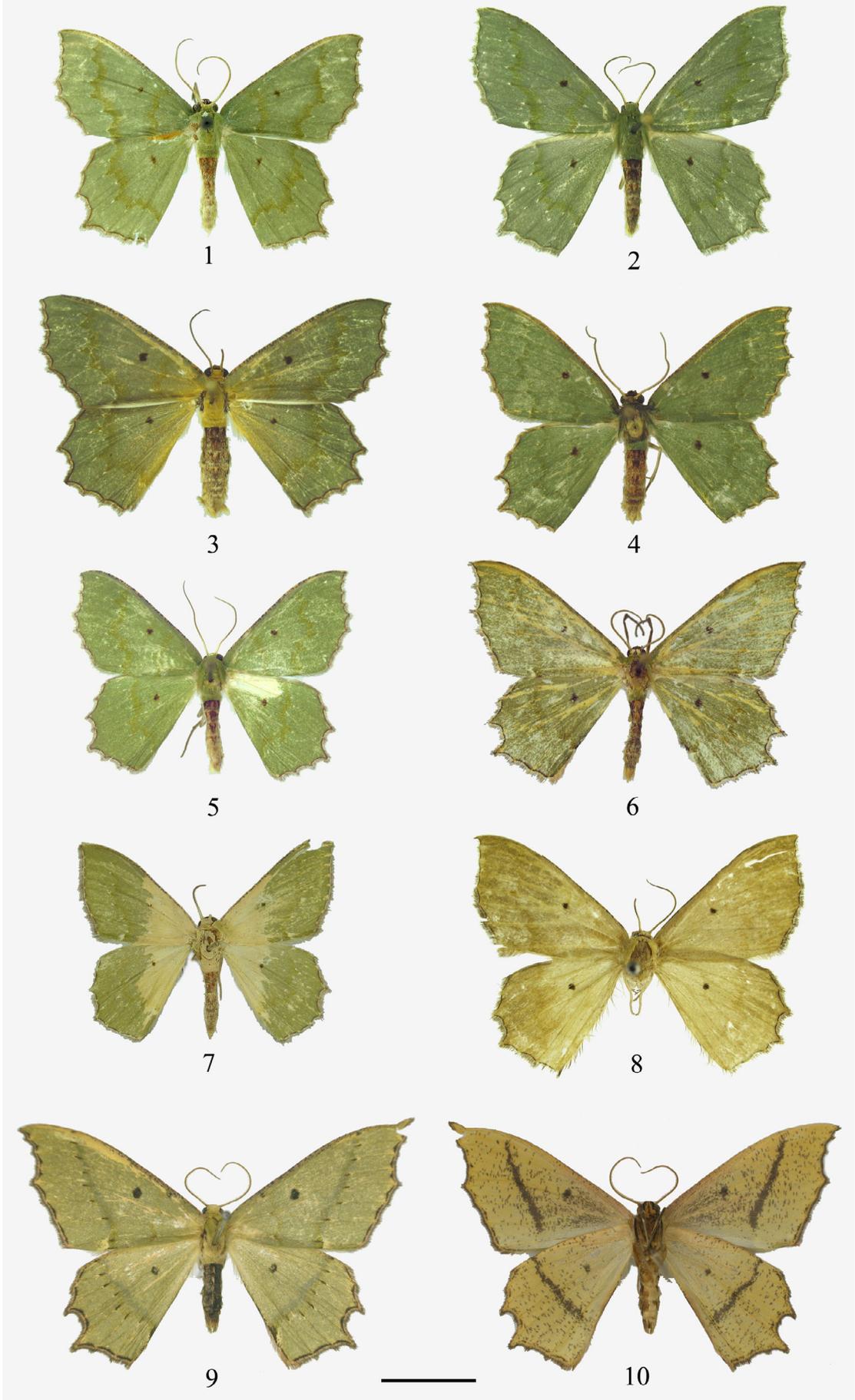
Distribution. China (Guizhou, Hainan, Yunnan), Vietnam, India, Myanmar, Nepal, Thailand, Malaysia (Peninsula and Borneo), Indonesia (Sumatra, Java, Borneo).

Biology. Holloway (1996) redescribed the larva of *E. robustaria* based on the unpublished description of Bell: the larva has a square head, conical vertices, cylindrical body, and granular skin; the body is leaf green with a dark green dorsal line; on each segment, oblique dark lines diverge from the dorsal line anteriorly to the posterior margin at the level of the spiracle; a dark green suffusion is present in the angle between these lines and the dorsal line; the spiracles are sometimes surrounded by pink. Holloway also stated that the resting posture of the larva is stick-like, and that the markings resemble the leaflets of the host-plant, which belongs to *Acacia* (Leguminosae). Pupation is within a silken cocoon spun among these leaflets.

Notes. There are some variations in the male genitalia as follows: (a) manica of aedeagus with process (Figs. 24–25). Specimens from Dongwuliangshan, Yunnan, Xishuangbanna Bubeng, Yunnan (Figs. 11, 24), Vietnam (Figs. 12, 25) belong to this series; (b) manica of aedeagus without process, just wrinkled (Figs. 26–29). Materials from Hainan, some from Yunnan, India, Nepal, N. Thailand and Sumatra fall into this series. Even in this series, some variations are present. The costal margin of the valva in the male genitalia of the specimen from Hekou Xiaonanxi, Yunnan (Fig. 13) is almost straight, the apex of valva blunt and rounded, whereas, the costal margin of the other materials in this series is more or less expanded. The apex of

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FIGURES 1–10. Moth of *Episothalma* and *Pseudepisothalma*. 1–5. *E. robustaria*. 1, From Khasis, India; 2, From Vietnam; 3, From Hainan, China; 4, From Thailand; 5, From South India; 6, *E. irrobustaria* sp. nov., holotype; 7, *E. cognataria*; 8, *E. cuspidata* sp. nov., holotype; 9–10. *Pseudepisothalma ocellata*. 9, dorsum; 10, venter. Scale bar = 1.5 cm.



valva of materials from South India (Fig. 14), Nepal (Fig. 15) and Hainan (Fig. 16) is much broader, and not as round as in the first series. A small process is present on the apex of the materials from Thailand north (Fig. 17) and Xishuangbanna Bubeng, Yunnan (Fig. 18). Variations are also present in transtilla and juxta. For example, the transtilla of the specimen from Xishuangbanna Bubeng, Yunnan (Fig. 11) is broader and shorter than that of a specimen from South India (Fig. 14), which is very long and narrow; the juxta of the former is large and the posterior margin is fairly semicircular, whereas the juxta of the latter is oval and very small. Since variations occur in the male genitalia even among specimens from the same locality such as Xishuangbanna Bubeng, Yunnan (Figs. 11, 18), there is no justification for generating a range of similar species based on them.

***Episothalma irrobustaria* Xue & Wang, sp. nov.**

Fig. 6

Description. Head: Antenna ciliate in male. Frons reddish brown, smooth-scaled. Labial palpus pale brown, ventrally whitish, not extending beyond frons in male. Vertex with anterior half white, posterior half grass green. Thorax: Dorsum grass green. Hind tibia in male with one pair of terminal spurs. Length of forewing: ♂19 mm. Forewing with apex pointed; outer margin under apex concave, forming a small process on vein M_3 ; outer margin of hind wing concave between M_1 and M_3 , forming processes on both veins. Wings: ground colour grass green. Forewing with costa orange yellow, diffused with black scales; antemedial line yellowish green, indistinct; postmedial lines on both wings yellowish green, irregularly dentate, forming an irregular dark brown patch on the inner margin on both wings. Discal spot black. Terminal line dark brown, interrupted on veins. Fringes yellowish green mixed with dark brown. Ventral side pale green, diffused with dark brown scales, denser proximate to postmedial line on forewing; distinct discal spot dark brown; postmedial line dark brown, dentate, much thicker on veins. Abdomen: Dorsum reddish brown mixed with black, with developed reddish brown crests from second to fourth segment. Male genitalia (Figs. 19, 30). Uncus sclerotized, tapered and not blunt at apex. Socii slightly sclerotized, tapered, similar length to uncus. Gnathos with lateral arms not joined in the middle. Valva long and narrow; terminal half broader than base, blunt; costal margin sclerotized basally to one quarter, slightly concave, then straight at middle and slightly protruding near apex; an irregularly wrinkled ridge with dense hair present at center; a pointed sclerotized hook-like tooth present near center, posterior to which is a small sclerotized lobe, the area anterior to the lobe sclerotized and extending to ventral margin. Transtilla a large weakly sclerotized plate, posterior margin almost straight. Juxta slightly sclerotized with posterior margin well sclerotized, arced. Saccus not protruding, but vinculum protruding far beyond valva base. Coremata fairly developed. Aedeagus slender, sclerotized posteriorly, vesica sclerotized and wrinkled, without cornutus; manica with one sclerotized process. Female genitalia unknown.

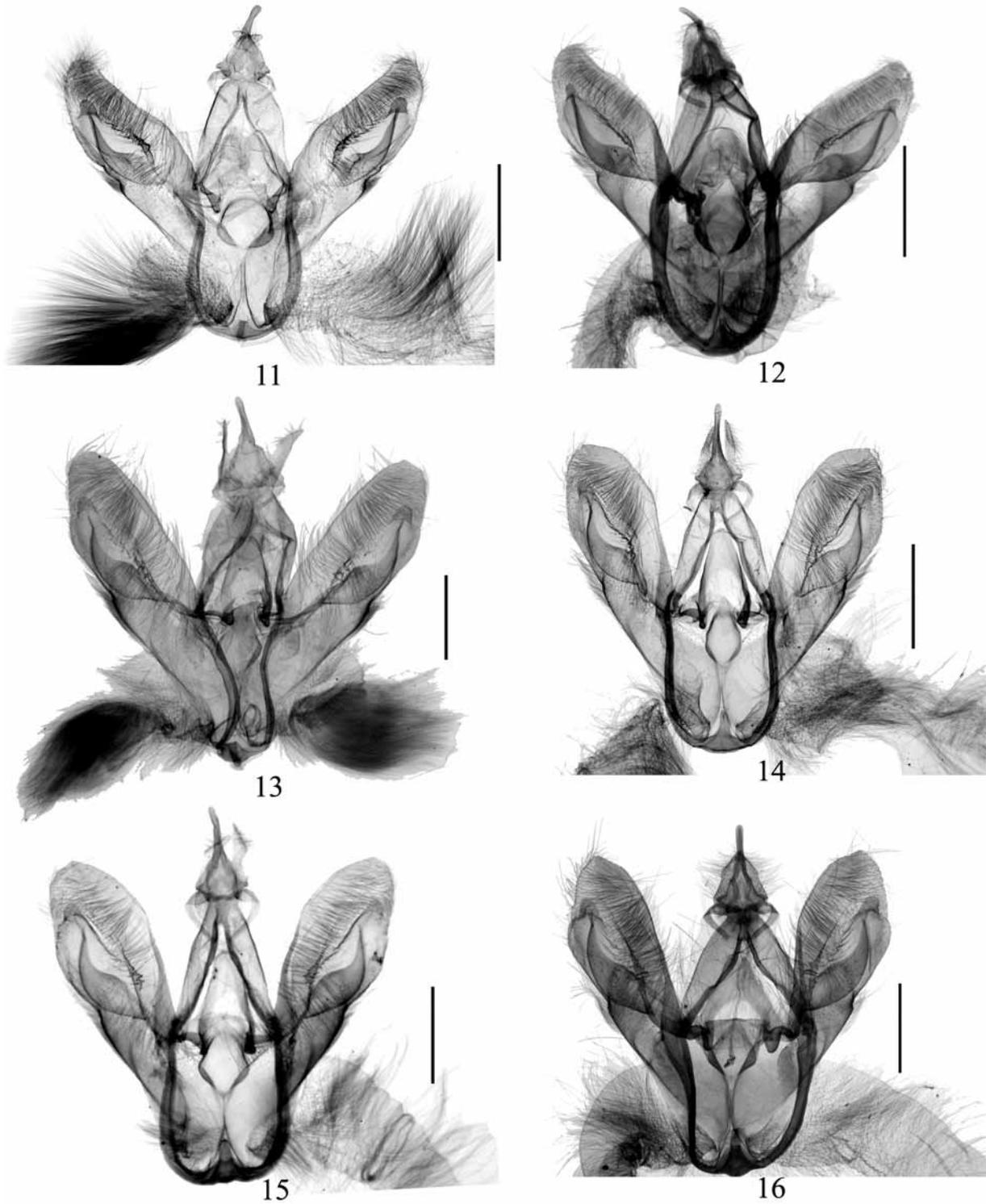
Diagnosis. This new species is quite close to *E. robustaria* on both external features and male genitalia. The apex of the forewing in *E. irrobustaria* is a little more protruding than that of *E. robustaria*. *E. irrobustaria* is distinctive in the male genitalia (Fig. 19): the small sclerotized lobe on the valva is much further from the ventral margin, located almost in the middle between costa and ventral margin, whereas, this lobe is close to the ventral margin in *E. robustaria*; the area anterior to the lobe is also sclerotized and extends to the ventral margin, whereas in *E. robustaria* this area is unmodified. In addition, the uncus of *E. irrobustaria* is tapering and not as blunt as in *E. robustaria*.

Material examined. Holotype ♂, **THAILAND:** Thailand: Changwat Nan, 30 km E of Pua, 1700 m, 20.II.1996, leg. Márton Hreblay and Csaba Szabóky (SOMM.M.).

Etymology. This species name is combined from Latin prefix *in-* and *robustaria*, which means not *robustaria*.

Distribution. Thailand.

Biology. Unknown.



FIGURES 11–16. Male genitalia of *E. robustaria*. 11, From Xishuangbanna Bubeng, Yunnan, China; 12, From Vietnam; 13, From Hekou Xiaonanxi, Yunnan, China; 14, From South India; 15, From Nepal; 16, From Hainan, China. Scale bar = 1 mm.

***Episothalma cognataria* Swinhoe, 1903**

Fig. 7

Episothalma cognataria Swinhoe, 1903, *Ann. Mag. nat. Hist.* (7) 11: 510. Syntype(s) ♂, Siam [Thailand]: Muok-Lek, 1000 ft. (BMNH)

Redescription. Head: Antenna ciliate in male. Frons dark brown, smooth-scaled. Labial palpus not extending beyond frons. Vertex grass green. Thorax: Dorsum grass green. Hind tibia in male with one pair of terminal spurs. Length of forewing: ♂ 15.5 mm. Forewing with outer margin under apex slightly concave; outer margin of hind wing concave between M_1 and M_3 , forming a process on both veins. Wings ground colour grass green. Forewing with costa orange yellow, densely diffused with black scales; antemedial line on forewing indistinct; postmedial lines on both wings yellowish green, irregularly dentate, indistinct, posteriorly accompanied by white dots on veins. Discal spot black. Terminal line dark brown, interrupted on veins. Fringes greyish brown. Ventral side nearly white, with slight pale green tinge; discal spot dark brown; postmedial line indistinct, only visible on veins; terminal line same as that on dorsal side. Abdomen: Dorsum reddish brown mixed with black, crests reddish brown, developed from second to third segment. Male genitalia (Figs. 20, 31): Uncus fairly sclerotized, with apex blunt. Socii slightly sclerotized, tapered, with a process at middle proximally. Gnathos with lateral arms not joined in the middle. Valva broad and short, with terminal part membranous, tapered and blunt; costa nearly straight; densely hairy in the middle; a pointed sclerotized hook-like tooth present near center, posterior to which, is a transverse sclerotized band extending to ventral margin of valva, with a series of large teeth on margin, and bearing a large blunt posterior process. Transtilla a large, lightly sclerotized plate, with apex shallowly concave. Juxta sclerotized, posterior margin inverse U-shaped. Saccus not protruding. Coremata developed. Aedeagus developed, with terminal part strongly sclerotized, vesica densely wrinkled, manica with one sclerotized process. Female genitalia unknown.

Material examined. **THAILAND:** syntype ♂, Siam, Muok-Lek, 1000 feet, Januar, H. Fruhstorfer, 1903-177 (other labels: red "Type" label; *Episothalma cognataria* Swinho. ♀ type) (BMNH); **CHINA:** Yunnan: Xishuangbanna Bubeng, 700 m, 14.IX.1993, coll. Cheng Xinyue, 1 ♂ (IZCAS).

Distribution. China (Yunnan), Thailand.

Biology. Unknown.

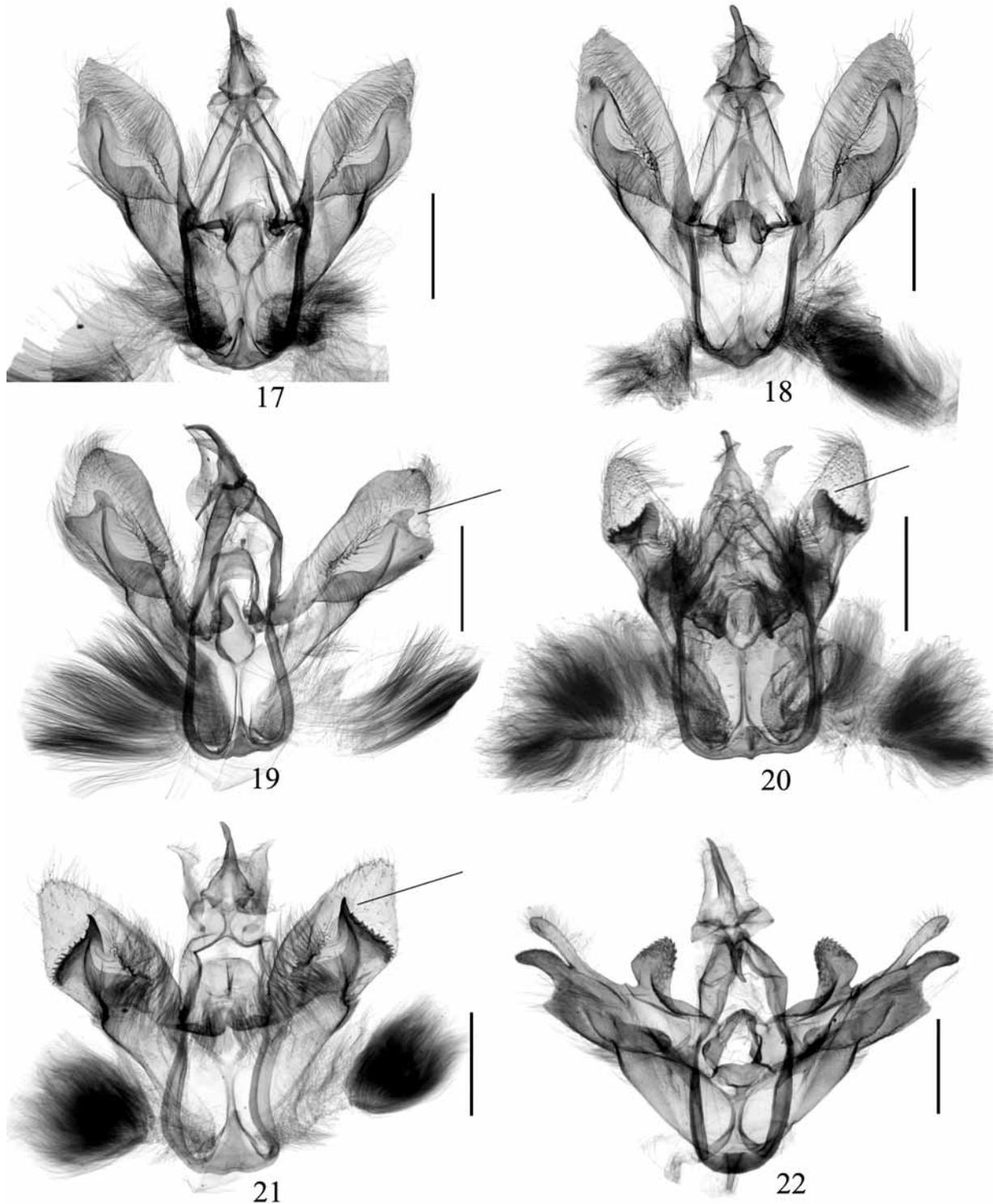
Notes. In the original description, the author did not state how many specimens were examined, but made it clear that this species was described on the basis of a female. In the collection of the BMNH, there is only a single male specimen, which bears a label matching the record in the original description, as well as the type label. There therefore seems little doubt that this is the holotype, and that Swinhoe's designation of it as "♀" was an error.

Episothalma cuspidata Xue & Wang, sp. nov.

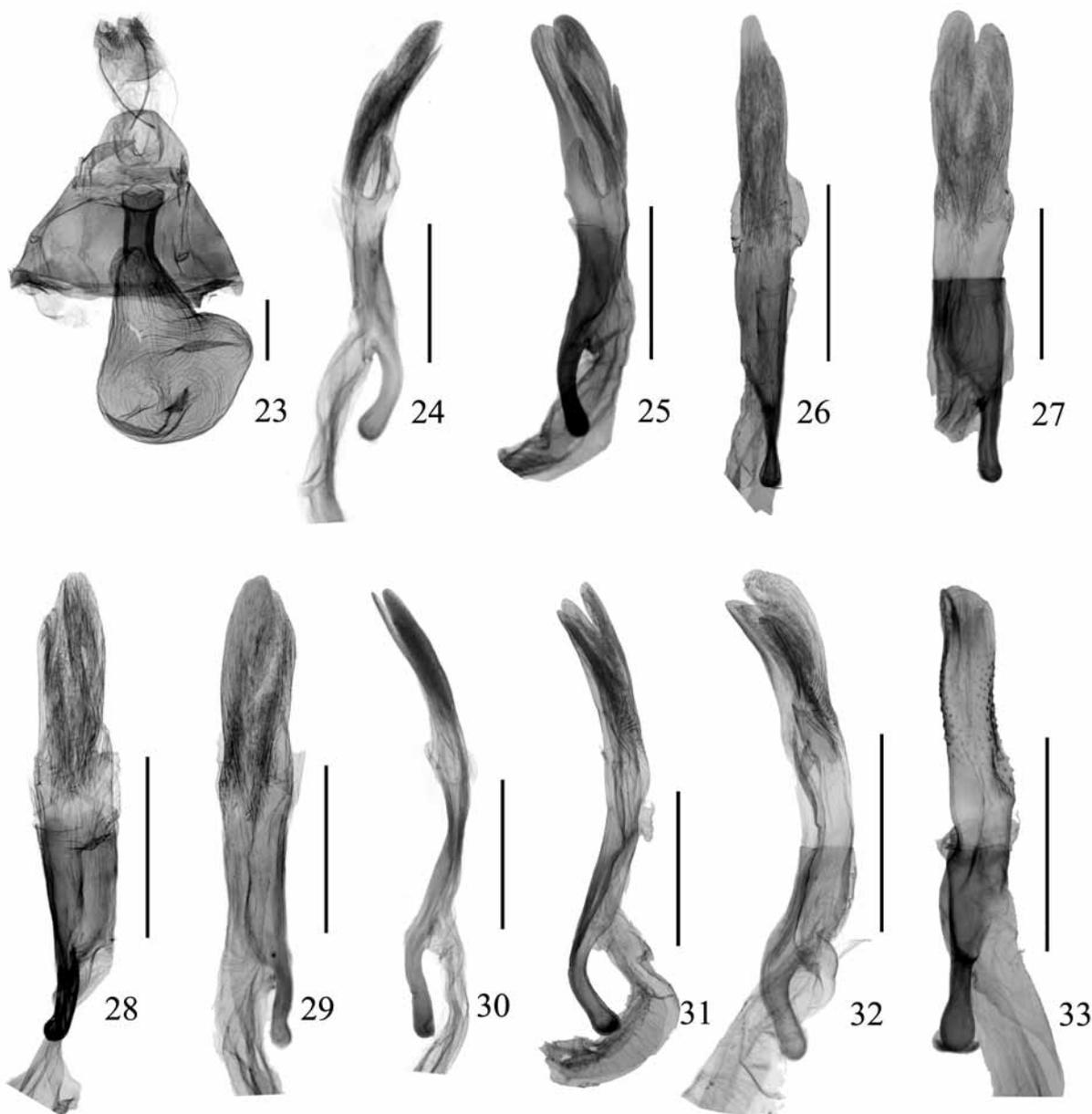
Fig. 8

Description. Head: Antenna ciliate in male. Frons reddish brown, smooth-scaled. Labial palpus darkish brown, ventrally whitish, very short and not extending beyond frons in male. Thorax: Hind tibia in male with one pair of terminal spurs. Length of forewing: ♂ 19 mm. Forewing with apex pointed; outer margin under apex slightly concave; outer margin of hind wing concave between M_1 and M_3 , forming a process on both veins. Wings: ground colour grass green. Costa of forewing diffused with black scales. Transverse lines indistinct because of discoloration. Discal spot black. Terminal line dark brown, interrupted on veins. Fringes dark brown. Ventral side pale green, diffused with dark brown scales, denser proximate to postmedial line on forewing; distinct discal spot dark brown; postmedial line dark brown, dentate. Abdomen: Male genitalia (Figs. 21, 32). Uncus sclerotized, with apex blunt. Socii slightly sclerotized, tapered, with a process at middle proximally. Gnathos with lateral arms very short, not joined in the middle. Valva broad, with terminal part membranous, tapered but blunt; costa margin with basal two-thirds sclerotized, slightly convex; irregularly wrinkled ridge with dense hair present in the middle; a pointed sclerotized hook-like tooth present near center, posterior to which is, a transverse sclerotized band extending to ventral margin of valva, with a series of large teeth on the margin and a large pointed posterior process. Transtilla a large, slightly sclerotized plate. Juxta sclerotized, posterior margin a reversed U-shape. Saccus not protruding. Coremata developed. Aedeagus

developed, with terminal part strongly sclerotized, vesica densely wrinkled, manica with one large sclerotized posterior process and a small pointed one near middle. Female genitalia unknown.



FIGURES 17–22. Male genitalia. **17–18.** *E. robustaria*. 17, From Thailand; 18, From Xishuangbanna Bubeng, Yunnan, China; 19, *E. irrobustaria* **sp. nov.**; 20, *E. cognataria*; 21, *E. cuspidata* **sp. nov.**; 22, *Pseudepisothalma ocellata*. Scale bar = 1 mm.



FIGURES 23–33. 23. Female genitalia of *E. robustaria*. 24–29. Aedeagus of *E. robustaria*. 24, From Xishuangbanna Bubeng, Yunnan, China; 25, From Vietnam; 26, From South India; 27, From Hainan, China. 28, From Thailand; 29, From Xishuangbanna Bubeng, Yunnan, China; 30, *E. irrobustaria* **sp. nov.**; 31, *E. cognataria*; 32, *E. cuspidata* **sp. nov.**; 33. *Pseudepisothalma ocellata*. Scale bar = 1 mm.

Diagnosis. This new species is close to *E. cognataria* but can be distinguished by the following differences: on the wing shape, *E. cuspidata* is larger than *E. cognataria*, and the outer margin posterior to the apex on the forewing and between M_1 and M_3 on hind wing is more deeply concave than in *E. cognataria*. The most important difference is in the male genitalia: the posterior end of the transverse sclerotized band in the middle of the valva is pointed (Fig. 21), but it is quite blunt and rounded in *E. cognataria* (Fig. 20). In addition, the costal margin of *E. cuspidata* is convex, but it is almost straight in *E. cognataria*; the valva is much longer and broader than that of *E. cognataria*.

Material examined. Holotype, ♂, **CHINA**: Hainan: Jianfengling Tianchi, 13.IV.1980, coll. Zhang Baolin (IZCAS); paratype, ♂, Hainan: Jianfeng, 10.XI.1983, coll. Liu Yuanfu (IZCAS).

Etymology. The species name is from the Latin *cuspidatus*, which means pointed, referring to the pointed process on the valva.

Distribution. China (Hainan).

Biology. Collecting data (April–November) suggests that the species may have two generations.

***Pseudepisothalma* Han gen. nov.**

Type species. *Episothalma ocellata* Swinhoe, 1893.

Description. Head: Antenna ciliate in male. Frons with scales smooth, moderately protruding. Labial palpus short, not extending beyond frons. Thorax: Forewing with apex falcate; outer margin concave from apex to vein M_3 , and straight from vein M_3 to anal angle; anal angle nearly quadrate. Hind wing with apex rounded, outer margin deeply concave between vein M_1 and M_3 , forming large teeth on both veins; anal angle nearly quadrate. Venation same as that of *Episothalma*. Abdomen: Male genitalia (Figs. 22, 33). Uncus sclerotized, slender, tapered and pointed at tip. Socii broad, slightly sclerotized, shorter than uncus. Gnathos with median process long and pointed. Valva moderately sclerotized, terminal part with ventral half truncate, dorsal half with a strongly sclerotized, spinose process; costa forming a large sclerotized, rounded, spinose process near center; costal terminal process membranous, long and slender; ventral margin of valva concave at middle. Transtilla slightly sclerotized. Juxta sclerotized, labiate. Saccus not protruding. Coremata present. Aedeagus with terminal part sclerotized, spinose. Female genitalia unknown.

Etymology. This generic name is from the Latin *pseud-* and the genus *Episothalma*, which means not true *Episothalma*.

Diagnosis. The type species of this new genus *Pseudepisothalma* was originally placed in *Episothalma*, but the male genitalia are absolutely different from those of the members of that genus. For example: the gnathos of *Pseudepisothalma* has a developed median process, but it is absent in *Episothalma*; *Pseudepisothalma* does not have the typical hook-like structure on the valva, but has a developed process on the costal margin and a terminal process on the valva, which are absent in *Episothalma*. The aedeagus has many small spines on the manica in *Pseudepisothalma*, but has large processes or none in *Episothalma*. In wing pattern, *Pseudepisothalma* is different from *Episothalma* in having radial lines outside the postmedial lines on the dorsal side, a different colour and distinct straight postmedial lines on the ventral side.

The ventral side of the wings is reminiscent of that of *Chlorodontopera discospilata* (Moore, 1868), which is the only member of that genus with a yellow ventral side, in having a yellow background colour and straight dark postmedial lines. But the bipectinate antennae in the male immediately separates *Ch. discospilata* from *Pseudepisothalma*. *Pseudepisothalma* is also distinguished from *Ch. discospilata* by features of the male genitalia. For example, the uncus is deeply bifid and Y-shaped in *Ch. discospilata*, but is tapering and stick-like in *Pseudepisothalma*; the lateral arms of the gnathos of *Ch. discospilata* are separate though very long and with modification, but they are joined together in *Pseudepisothalma* and form a simple median process. In addition, *Ch. discospilata* has much larger discal spots on the dorsal side of the wings; *Ch. discospilata* bears two pairs of spurs in the male hind tibia, while *Pseudepisothalma* only has one pair of terminal spurs; sternite 3 in the male bears a pair of setal patches in *Ch. discospilata*, which are absent in *Pseudepisothalma*.

The male genitalia of the specimens on which *Pseudepisothalma* is based have uncus and socii reminiscent of the Hemitheini on the basis of the following characters: the socii and uncus are closely adpressed; the socii are shorter than the uncus; veins M_3 and CuA_1 of the hind wing are stalked. On this basis, they fall clearly within the tribe Hemitheini. But within the tribe, the male genitalia of this species are distinctive in having a very special unusual valva shape: the ventral half is truncate and a spinose process is present on the dorsal half, whereas other genera in the Hemitheini usually have blunt and rounded apices; the costal terminal process is membranous, but is usually sclerotized in the Hemitheini where it exists, for example in *Culpinia diffusa* (Walker). We conclude that it is not possible to fit this species convincingly into any other existing genus.

***Pseudepisothalma ocellata* (Swinhoe, 1893) comb. nov.**

Figs. 9–10

Episothalma ocellata Swinhoe, 1893b, *Ann. Mag. Nat. Hist.* (6) 12: 218. ♂, [India]: Khasi Hills (BMNH), herein designated as **lectotype**.

Chlorodontopera (Episthophthalma) ocellata: Hampson, 1895, *Fauna Br. India* (Moths) 3: 483.

Redescription. Head: Frons red brown mixed with black. Labial palpus dark brown. Vertex grass green. Thorax: Tegula grass green. Dorsum grass green, venter mixed with dull pink. Hind tibia in male slightly dilated, with one pair of terminal spurs. Length of forewing: ♂ 21 mm. Wings grass green. Forewing with costa pink and reddish brown, diffused with black; antemedial line pale yellowish green, wavy, appearing as small black dots on veins; postmedial line pale yellowish green, straight, slightly wavy, with short blackish green radial lines outside it on veins; terminal line blackish green, broken on veins; discal spot black, large; fringes with basal part pink red-brown, distal part dark green. Hind wing with discal spot smaller than that of forewing; postmedial, terminal lines, fringes same as those of forewing. Ventral side yellow dispersed with black; both wings with black discal spots; postmedial lines on both wings distinct, also discernible from dorsal side, almost straight; fringes black. Abdomen: Dorsum blackish red-brown, crested from second to fifth segment, the former two developed. Sternite 8 in male slightly sclerotized, with middle part concave. Male genitalia (Figs. 22, 33) as in description of the genus. Female genitalia unknown.

Material examined. **INDIA**: Lectotype of *Episothalma ocellata* Swinhoe, ♂, Khasi Hills, 94-66 (other labels: *Episothalma ocellata* Swinhoe, ♂ type; red type label) (BMNH); **CHINA**: Yunnan Tengchong Dahaoping, 2020 m, 24–26.V.1992, coll. Xue Dayong, 1♂ (IZCAS).

Distribution. China (Yunnan), India (Khasia Hills).

Biology. Unknown.

Notes. “Two examples” were recorded in the original description, and Scoble (1999) recorded “Syntypes 2♂ (BMNH)”. But only one male was found in the collection of the BMNH. A lectotype is designated herein for *P. ocellata* to provide nomenclatural stability to this taxon.

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