

Notes on the Cuculliine Moths of the Genus *Eupsilia* (Lepidoptera, Noctuidae) from Taiwan¹⁾

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Abstract A new species of the cuculliine noctuid moth is described from Taiwan under the name of *Eupsilia confusa*, and *Eupsilia quinquelinea* BOURSIN, 1956, described from Kwangtung, southern China, is newly recorded from Taiwan. Notes and collecting records of known rare moths, *E. virescens* YOSHIMOTO, 1985, *E. shyu* CHANG, 1991, and *E. strigifera* BUTLER, 1879, are given.

In the winter of 1992, we made a short collecting trip to the mountains of central and northern Taiwan, and were able to collect some interesting cuculliine noctuid moths. Notes on the genera *Hemiglaea* and *Xylena* were already published (OWADA, 1993; OWADA, HORIE & KOBAYASHI, 1993). In this paper, we will deal with the genus *Eupsilia* HÜBNER, [1821], based on this collection.

In Taiwan, four species of *Eupsilia* have hitherto been known. YOSHIMOTO (1985) described a new species, *E. virescens*, on the basis of specimens collected at Tayuling, central Taiwan, and recorded *E. strigifera* BUTLER, 1879, from the same locality. Then, he recorded "*E. contracta* (BUTLER, 1878)" on a male specimen secured by himself at Alishan, southern central Taiwan (YOSHIMOTO, 1988). We were able to collect several specimens of the same moth, and found that it is clearly different from Japanese *E. contracta*. It will be described as a new species in the following lines. CHANG (1991) illustrated and described *E. shyu* as a new species, and considered it to be related to *E. virescens*, though only one female specimen was known from Tatchia-anpu, 2,700 m, near Mt. Yushan, the highest mountain in Taiwan. In addition to these species, we were fortunate to have found two beautiful females of another species similar to *E. quadrilinea* (LEECH, 1889). After a careful examination of the original description and illustrations, we have tentatively concluded that it can be identified

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with *E. quinquelinea* BOURSIN, 1956, which was described on the basis of a male specimen from Kwangtung, southern China.

Eupsilia confusa OWADA et KOBAYASHI, sp. nov.

(Figs. 1, 2)

Eupsilia contracta: YOSHIMOTO, 1988, in KISHIDA & YOSHIMOTO, Japan Heterocerists' J., (145): 308; SUGI, 1992, in HEPPNER & INOUE (eds.), Lepid. Taiwan, 1 (2): 197. Nec BUTLER, 1878. Misidentification.

Male and female. Length of forewing: 18–20 mm; expanse: 37–43 mm.

Similar to *E. contracta* (BUTLER, 1878) (Figs. 3, 4), but easily distinguished from the latter by the following features.

Ground colour of body and wings chestnut brown, much darker and more tinged with red than in *contracta*. On the upperside of forewing, transverse lines and outlines of orbicular and reniform stigmata greyish white, slender, rather indistinct, while in *contracta* they are broad and distinct; ground colour on the underside darker and more reddish.

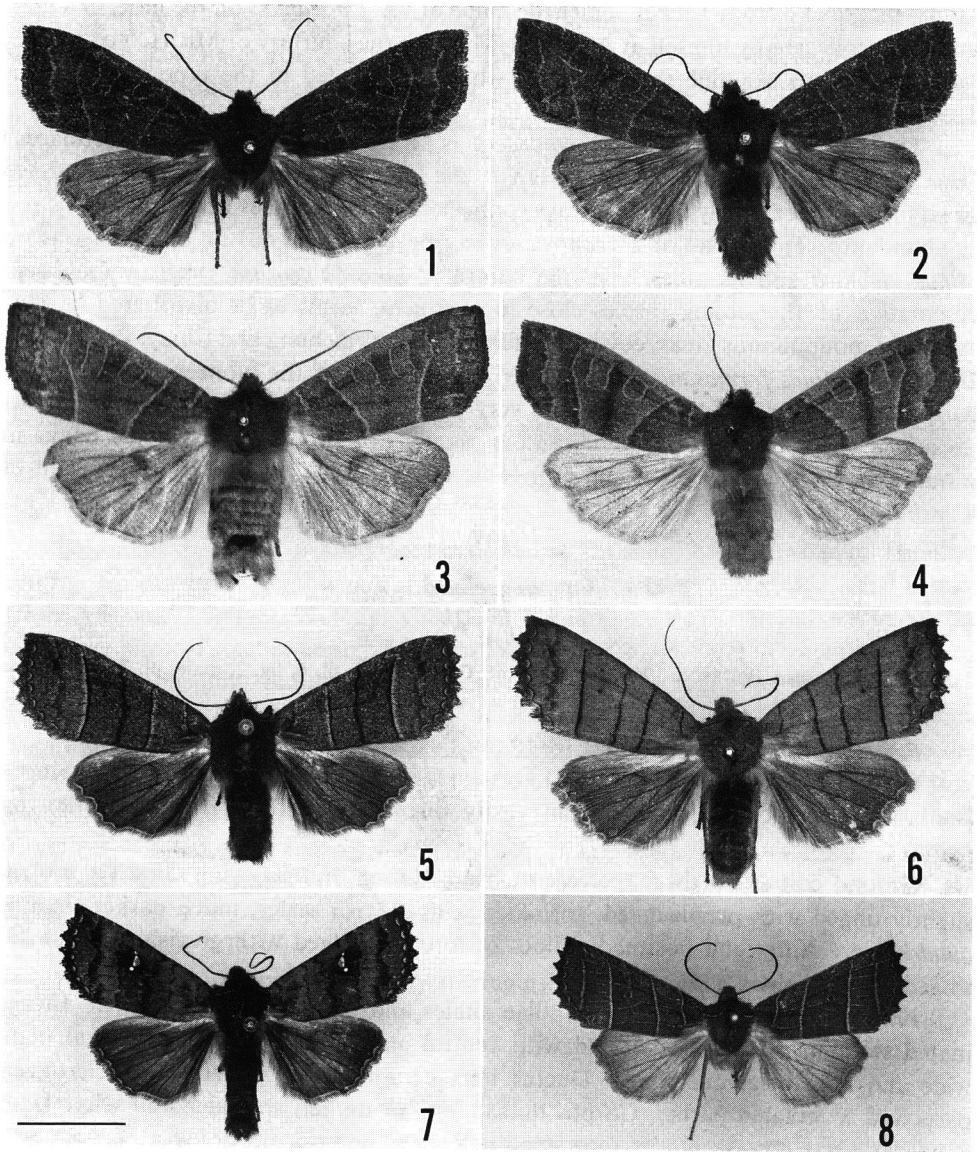
Male genitalia (Fig. 9). Similar to those of *E. contracta* (Fig. 10). Uncus long, bifurcate at apex, with broad middle portion; tegumen rather slender, peniculus not so developed; valvae symmetrical; ampulla short, with rounded apex; cucullus with weak coronal spines; harpe short; aedeagus short, with short broad coecum penis, vesica without prominent cornutus. In *contracta*, middle portion of uncus slenderer; valvae asymmetrical, ampulla of left valva much shorter than that of right valva; ampullae gradually narrowed towards pointed apices, much longer than those of *confusa*; aedeagus longer, coecum penis well developed, slenderer.

Female genitalia (Fig. 13). Similar to those of *E. contracta* (Fig. 12). Papillae anales slender; 8th segment rather long. Invaginated sterigma short U-shaped; ductus bursae very short; left shoulder of corpus bursae round, slightly sclerotized, ductus seminalis arising from it; corpus bursae long ovate, without signum.

Type series. Holotype ♂, Taiwan, Taoyuan, Fuhshing, Lalashan, 1,500 m, 20–22. I. 1992, M. OWADA leg., genit. slide no. NSMT 2211 ♂, preserved in National Science Museum, Tokyo. Paratypes: Same data as holotype, 7 ♂; Taoyuan, Fuhshing, Hsi-tung, 1,050 m, 1 ♀, 19, 24. I. 1992, M. OWADA leg.; Taoyuan, Fuhshing, Suleng, 1,000 m, 2 ♂ 1 ♀, 23. I. 1992, M. OWADA leg.; Ilan, Tatung, Jentse, 650 m, 1 ♀, 18. I. 1992, M. OWADA leg., genit. slide no. NSMT 2212 ♀; Taichung, Hoping, Tahsuehshan Mts., Anmashan, 2,000–2,300 m, 2 ♂ 3 ♀, 11–14. I. 1992, H. KOBAYASHI, K. HORIE & M. OWADA leg.; Chiayi, Wufeng, Alishan, 2,200 m, 1 ♂, 1–3. I. 1986, H. YOSHIMOTO leg.

Distribution. Taiwan.

Remarks. It is doubtless that this species is closely related to *E. contracta* (BUTLER) distributed over the Japanese main islands (Hokkaido, Honshu, Shikoku and Kyushu) (SUGI, 1982) and the Russian Primorye Territory (KONONENKO, 1977). YOSHIMOTO



Figs. 1-8. *Eupsilia* spp. — 1, *E. confusa* OWADA et KOBAYASHI, sp. nov., male, holotype; 2, ditto, female, paratype, Suleng, Taoyuan, Taiwan. — 3, *E. contracta* (BUTLER), male, Akigase, Saitama, Japan; 4, ditto, female, Shibecha, Hokkaido, Japan. — 5, *E. quinque-linea* BOURSIN, female, Anmashan, Taichung, Taiwan. — 6, *E. quadrilinea* (LEECH), female, Mt. Komayama, Kanagawa, Japan. — 7, *E. virescens* YOSHIMOTO, male, Suleng, Taoyuan, Taiwan. — 8, *E. strigifera* BUTLER, male, Tayuling, Hualien, Taiwan. Scale ca. 10 mm.

(1988) recorded it from Taiwan under the name of "*E. contracta*" on the basis of a male specimen collected by himself at Alishan. Through the courtesy of Mr. H. YOSHIMOTO, we were able to examine the specimen, which is included in the type series of this species.

The larval food plant of *E. contracta* is *Alnus japonica* (THUNB.), Betulaceae (EBATO, 1971; NISHIGAKI, 1971). In Japan, the known collecting sites of *E. contracta* are quite local, seemingly almost always connected with wet places where *Alnus japonica* is abundant. The larvae of *E. contracta* may be monophagous or oligophagous on *Alnus japonica* and its allies. On the contrary, *Eupsilia confusa*, the Taiwanese representative of the sibling species close to *contracta*, seems to be distributed in wide ranges of mountainous areas, covering Taoyuan, Ilan, Taichung and Chiayi Prefectures. In Taiwan, *Alnus formosana* (BURKILL) MAKINO is one of the pioneering trees in the early stage of the secondary succession, very common from low lands to mountainous areas less than 3,000 m in altitude, and is planted for protecting road side banks in mountains (LIU, 1960). It is quite possible that *Alnus formosana* is a host plant of *Eupsilia confusa*.

Eupsilia quinquelinea BOURSIN

(Fig. 5)

Eupsilia quinquelinea BOURSIN, 1956, Z. wien. ent. Ges., **41**: 40, pl. 6, fig. 2, male, pl. 7, fig. 9, male genitalia.

Female. Length of forewing: 18–19 mm; expanse: 34–39 mm.

Very similar to *E. quadrilinea* (LEECH, 1889) (Fig. 6) from Japan and Korea (RONKAY & PARK, 1993, p. 59), but easily distinguished from it by the following features.

Ground colour on the upperside of head, thorax and forewing chestnut brown, slightly tinged with purplish red, sprinkled with greyish scales, much darker than in *quadrilinea*. Ante- and postmedial lines of forewing edged with greyish white shade tinged with purple.

Female genitalia (Fig. 11). Papillae anales and 8th segment moderate. Invaginated sterigma shallow, separated with ventral and dorsal plates, the ventral plate wide and the dorsal one long. Ductus bursae rather long, mixed with sclerotized parts and scobinated parts. Corpus bursae long ovate, left shoulder well sclerotized, band-like signa represented by four small patches in anterior portion.

Material examined. Taoyuan, Fuhsing, Suleng, 1,000 m, 1 ♀, 23. I. 1992, M. OWADA leg., genit. slide no. NSMT 2224 ♀; Taichung, Hoping, Tahsuehshan Mts., Anmashan, 2,000–2,300 m, 1 ♀, 11–14. I. 1992, H. KOBAYASHI leg.

Distribution. China (Kwangtung); Taiwan (new record).

Remarks. BOURSIN (1956) described *E. quinquelinea* on the basis of a rather worn male specimen collected in Kwangtung, southern China, from the HÖNE collection in Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn. He

compared this species with *E. quadrilinea* from Japan, and stated that, "Die Färbung ist aber ein gesättigtes Kastanien-(rötlich-)braun und die vier parallellaufenden Querlinien nebst Mittelschatten, welcher hier wie eine normale Querlinie aussieht, sind deutlicher". No female specimen has hitherto been known. Since the wing maculation of two Taiwanese female specimens accords well with the illustration and description of the male holotype, we have identified them as belonging to the same species of southern Chinese *quinquelinea* for the present paper and are looking for discovery of male specimens from Taiwan.

Eupsilia virescens YOSHIMOTO

(Fig. 7)

Eupsilia virescens YOSHIMOTO, 1985, Tyô to Ga, **35**: 189, fig. 1, female, fig. 7, male genitalia, fig. 15, male abdominal brush-organ, fig. 23, female genitalia; YOSHIMOTO, 1988, in KISHIDA & YOSHIMOTO, Japan Heterocerists' J., (145): 308; CHANG, 1991, Illust. Moths Taiwan, (5): 167, with illustration of female in colour; SUGI, 1992, in HEPPNER & INOUE (eds.), Lepid. Taiwan, 1 (2): 197.

Originally described on specimens collected at Tayuling, 2,600 m, Hsiulin, Hualien, central Taiwan in November and March. YOSHIMOTO (1988) recorded this species from Alishan, 2,200 m, Wufeng, Chiayi, in January. CHANG (1991) added two more collecting sites: Tatachia-anpu, 2,700 m, Wufeng, Chiayi, and Tienchih, 2,200 m, Taoyuan, Kaohsiung, and noted that the moth flies to the beginning of April.

Material examined. Holotype ♂ of *E. virescens*, Taiwan, Hualien, Hsiulin, Tayuling 2,600 m, 10–11. XI. 1983, K. YAZAKI leg., in National Science Museum, Tokyo. Taoyuan, Fuhsing, Lalashan, 1,500 m, 1 ♀, 20–22. I. 1992, M. OWADA leg.; Taoyuan, Fuhsing, Suleng, 1,200 m, 1 ♂, 25. I. 1992, M. OWADA leg.; Hualien, Hsiulin, Tayuling, 2,560 m, 1 ♀, 8–9. III. 1978, 2 ♀, 9–10. III. 1980, T. TANABE leg., 2 ♀, 24–25. III. 1980, T. SHIMOMURA leg.; Taichung, Hoping, Tahsuehshan Mts., Anmashan, 2,000–2,300 m, 1 ♂ 1 ♀, 11–14. I. 1992, K. HORIE & M. OWADA leg.

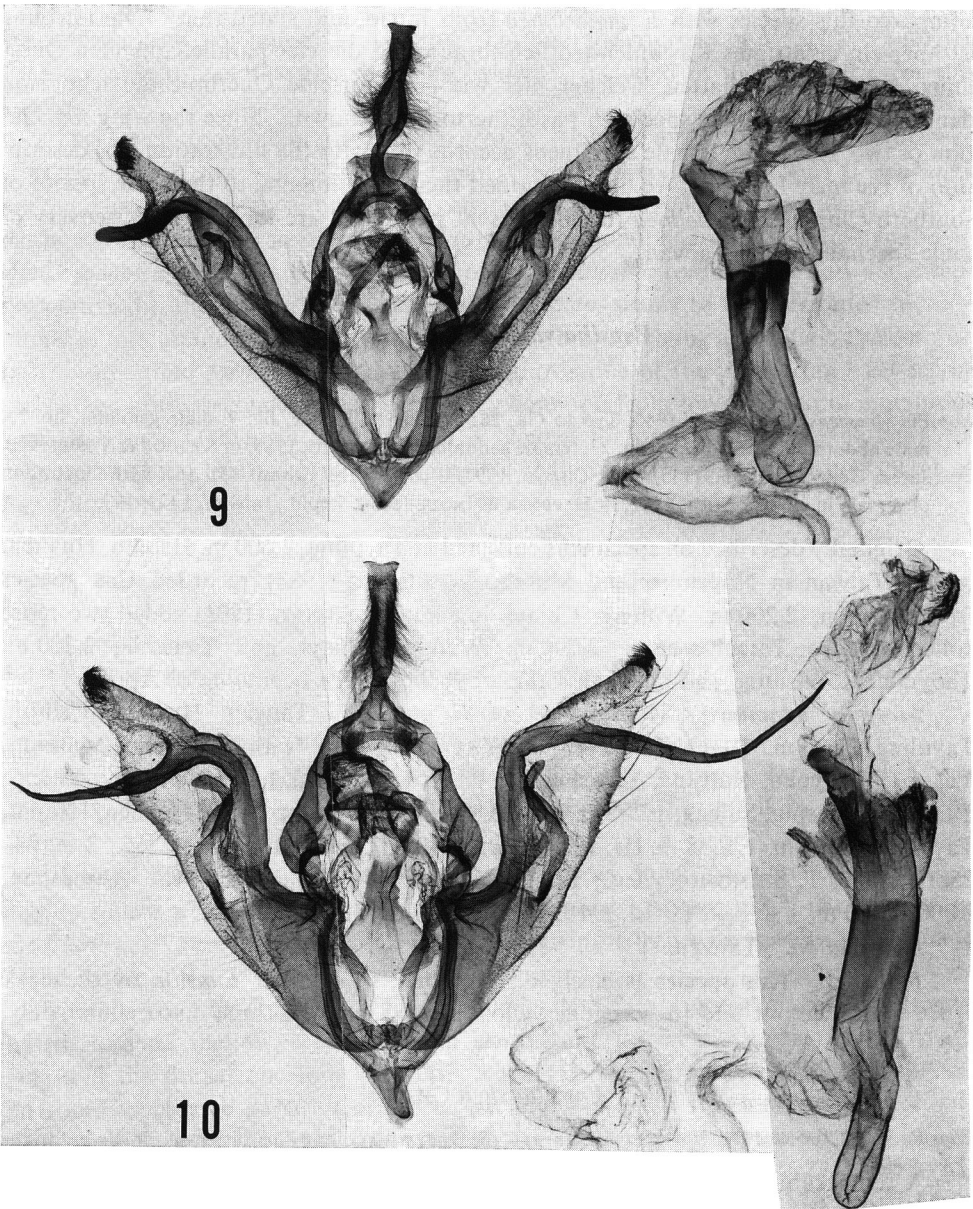
Distribution. Taiwan.

Remarks. This species is easily distinguished from other *Eupsilia* by the dark green ground colour and the orange yellow central mark of three discocellular dots.

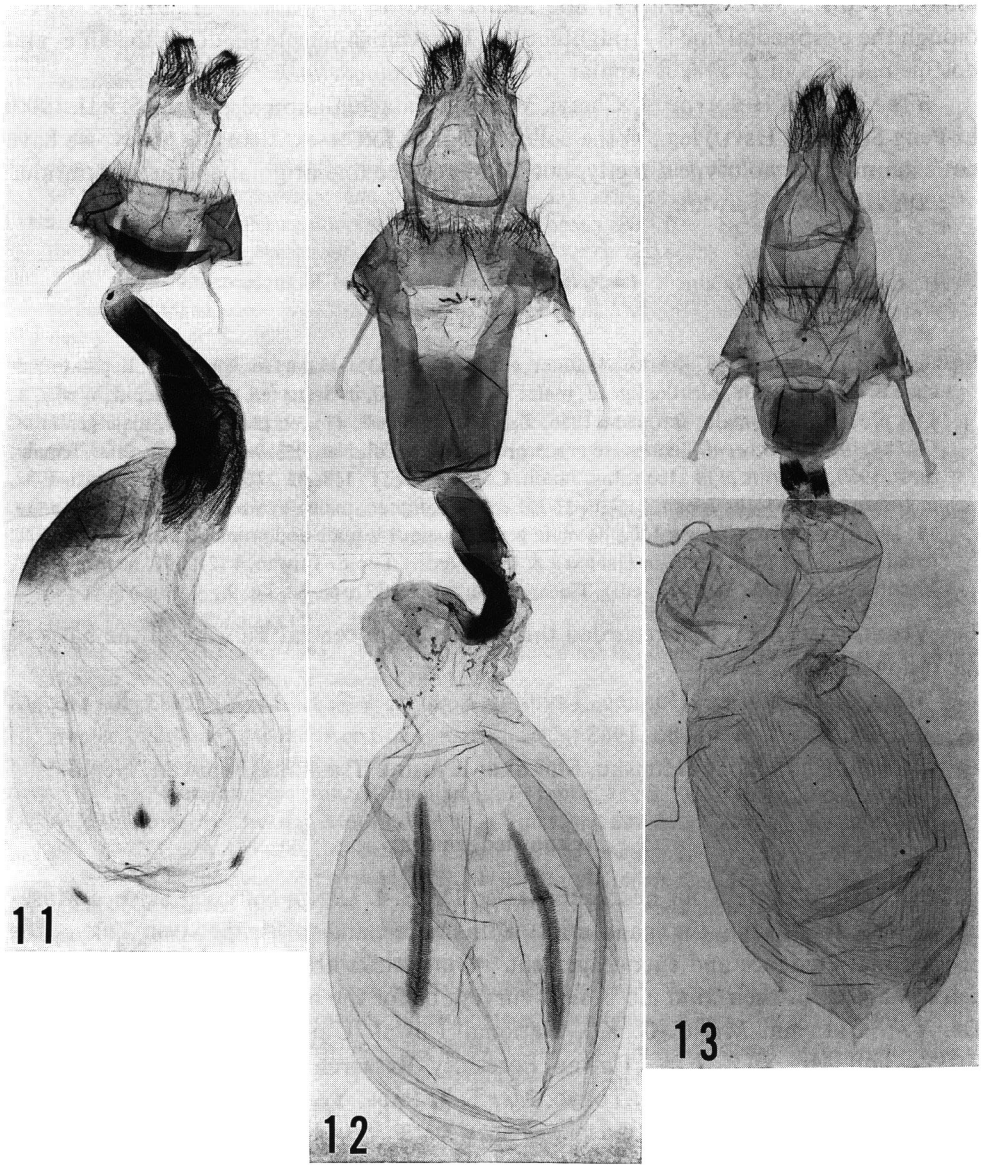
Eupsilia shyu CHANG

Eupsilia shyu CHANG, 1991, Illust. Lepid. Taiwan, (5): 168, with colour illustration of female holotype.

A remarkable moth probably close to *E. virescens*. In the original description, CHANG (1991) pointed out the diagnostic characters as follows: "this species is similar to the preceding species (*virescens*), 1) the ground colour of forewing olive-green, tinged with brown, instead of blackish green in *virescens*, 2) the subbasal, ante- and post-medial lines reddish brown, straight, edged with whitish purple shade, while they are black and slightly waved in *virescens*; 3) the three discocellular marks white, weak and slender, while in *virescens* they are prominent and the central large mark is dusted with



Figs. 9-10. Male genitalia of *Eupsilia* spp. — 9, *E. confusa* OWADA et KOBAYASHI, sp. nov., holotype. — 10, *E. contracta* (BUTLER), genit. slide no. NSMT 2222 ♂, Akigase, Saitama, Japan.



Figs. 11-13. Female genitalia of *Eupsilia* spp. — 11, *E. quinquelinea* BOURSIN, genit. slide no. NSMT 2224 ♀. — 12, *E. contracta* (BUTLER), genit. slide no. NSMT 2223 ♀, Yochi, Ina, Nagano, Japan. — 13, *E. confusa* OWADA et KOBAYASHI, sp. nov., paratype, genit. slide no. NSMT 2212 ♀.

orange yellow." The antemedial and medial lines of *E. virescens* are always waved, though the postmedial line is straightened. The whitish purple shade on the ante- and postmedial lines in *E. shyu* is similar to that in *E. quinquelinea*.

Type series. Holotype ♀, Chiayi, Wufeng, Tatachia-anpu, 2,700 m, 15. XII. 1990, Li-Peng SHYU (or HSYU) leg., in the collection of B. S. CHANG. In this study, we have not examined the holotype directly, but examined the fine original colour illustration.

Distribution. Taiwan.

Eupsilia strigifera BUTLER

(Fig. 8)

Eupsilia strigifera BUTLER, 1879, Ann. Mag. nat. Hist., (5), 4: 363; HAMPSON, 1906, Cat. Lepid. Phalaenae Br. Mus., 6: 438, pl. 106, fig. 13, male; WARREN, 1910, in SEITZ (ed.), Macrolepid. World, 3: 144, pl. 35, row d, male; BOURSIN, 1956, Z. wien. ent. Ges., 41: 39, pl. 7, fig. 7, male genitalia; OGATA, 1958, ESAKI *et al.*, Icones Heterocerorum Japon. Col. Nat., [2]: 98, pl. 93, fig. 2029, female; SUGI, 1959, in INOUE *et al.*, Icon. Ins. Japon. Col. nat. ed., 1: 118, pl. 77, fig. 17, male; SUGI, 1982, in INOUE *et al.*, Moths Japan, 1: 730, 2: 361, pl. 179, fig. 26, male; YOSHIMOTO, 1985, Tyô to Ga, 35: 196 (record from Taiwan), fig. 6, male genitalia, fig. 14, male abdominal brush-organ, fig. 22, female genitalia; SUGI, 1992, in HEPPNER & INOUE (eds.), Lepid. Taiwan, 1 (2): 197, nos. 786, 788; YOSHIMOTO, 1993, in HARUTA (ed.), Tinea, 13 (Suppl. 3): 131, pl. 62, fig. 9.

YOSHIMOTO (1985) first recorded this species from central Taiwan on the basis of the following specimen.

Material examined. Hualien, Tayuling 2,600 m, 1 ♂, 10–11. XI. 1983, K. YAZAKI leg., genit. slide no. HY-1086, 1983 (♂).

Distribution. Japan (Honshu, Shikoku, Kyushu, Tsushima), Taiwan, Nepal.

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