

## On the Cuculline Genus *Isopolia* (Lepidoptera, Noctuidae), with Descriptions of Four New Species<sup>1)</sup>

By

**Mamoru OWADA**

Department of Zoology, National Science Museum, Tokyo

The genus *Isopolia* was erected by WARREN (1913) for the type-species, *Pachypolia himalayensis* HAMPSON, 1906, from Sikkim, a junior synonym of *Apamea strigidisca* MOORE, 1881, from Darjeeling (BOURSIN, 1943). In his review of DRAUDT's paper (1950) on the noctuid fauna of China, BOURSIN (1952) pointed out that *Morrisonia angarensis* DRAUDT from Lichiang was nothing but a synonym of *Isopolia strigidisca*, and later (1958) he illustrated the male genitalia of the holotype of *M. angarensis*. In addition to these, SUGI (1958) recorded it from central and western Japan.

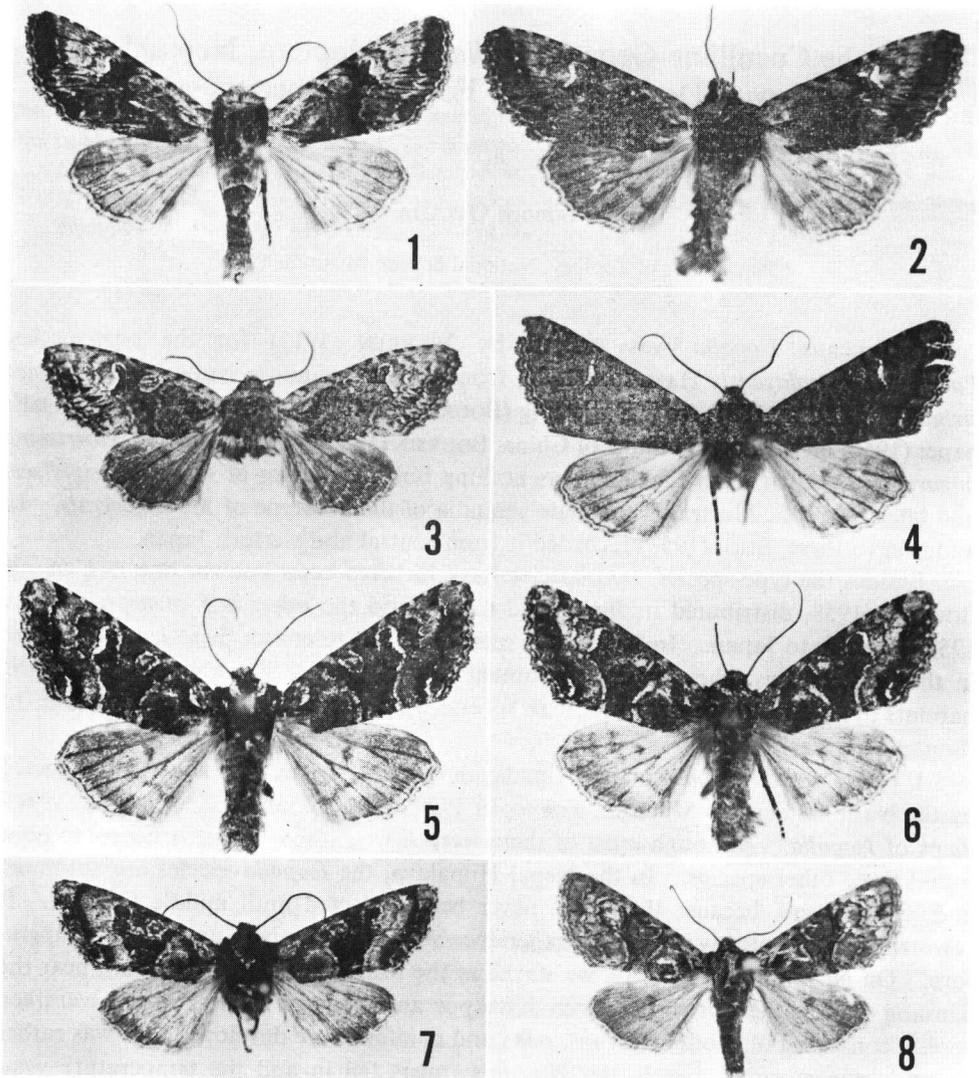
Besides the type-species, two species have hitherto been known, one is *I. hoenei* BOURSIN, 1958, distributed in Japan and China, and the other is *I. stenoptera* SUGI, 1959, endemic to Japan. In Japan, it is rather difficult to collect these *Isopolia*-species in the field, because they are late autumnal to early winter flyers and because their habitats are restricted to evergreen oak forests which become sporadical now due to human activities.

I participated in two Nepal-Himalayan zoogeographic expeditions conducted by the National Science Museum, Tokyo, in 1979 and 1981, and collected many specimens of *Isopolia*. Although most of them were *I. strigidisca*, I was fortunate to have found three other species. In the Nepal Himalaya, the *Isopolia*-species are autumnal and winter flyers, because they have never been collected until middle October. It is worth while to note my interesting experience about their activity under cold temperature. On November 12th, 1979, we stayed at the Magarka Danda (3,310 m), near the Tinsang La on the borders between Janakpur and Bagmati Zones, where evergreen forests consisting of rhododendrons, oaks and conifers were developed. It was rather warm in the morning, but in the afternoon mists fell in and the temperature went down rapidly. At 4 p.m., our tents were completely frozen, and at the time my generator was started on, it was as cold as  $-4^{\circ}\text{C}$ . However, I was able to collect nearly 50 moths in 3 hours, most of which were *I. strigidisca*, mixed with *Epipsestis*-species of thyatirids, which were studied by YOSHIMOTO (1982). They were very active, flying vigorously even at  $-7^{\circ}\text{C}$ . It should be stressed, however, that after resting on the ground or a light trap screen, they never moved again.

In this paper, I will describe four new species of *Isopolia*, of which three were

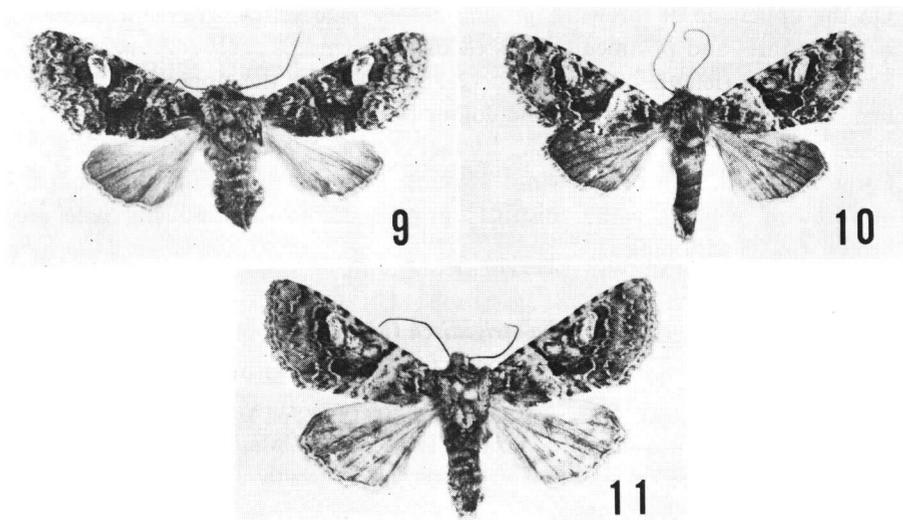
---

1) This study is supported by the Grants-in-aid for Overseas Scientific Survey Nos. 404101, 56041060 and 57043055 from the Ministry of Education, Science and Culture, Japan.



Figs. 1-8. *Isopolia* spp. — 1, *I. strigidisca* (MOORE), ♂, Nepal. — 2, *I. strigidisca* (MOORE), ♂, Japan. — 3, *I. stenoptera* SUGI, paratype ♂, Japan. — 4, *I. variabilis* sp. nov., holotype ♂, Nepal. — 5, *I. variabilis* sp. nov., paratype ♀, India. — 6, *I. variabilis* sp. nov., paratype ♂, Nepal. — 7, *I. variabilis* sp. nov., paratype ♀, Nepal. — 8, *I. muscipennis* sp. nov., holotype ♂, Nepal.

collected by myself during the Nepal Himalayan expeditions and the remaining one was collected by Mr. Hiroshi ENDO in October 1977 in the mountainous areas of Taiwan. Three known species were already described in detail as regards their external characters with brief descriptions of male genitalia. In this paper, therefore, only their genitalic



Figs. 9-11. *Isopolia* spp. — 9, *I. hoenei* BOURSIN, ♀, Japan. — 10, *I. endoi* sp. nov., holotype ♂, Taiwan. — 11, *I. viridimaculata* sp. nov., holotype ♀, Nepal.

characters will be described with brief notes on their relationship and complete lists of literature. A key to all the species of *Isopolia* based on their wing maculations will be given in the following lines.

**Key to the Species of *Isopolia*, Based on Wing Maculation**

1. Reniform stigma slender, constricted at middle.....2
- Reniform stigma broad, not constricted at middle.....5
2. Ground colour on the upperside of forewing ochre, suffused with reddish brown .....3
- Ground colour on the upperside of forewing not ochre, blackish red-brown, light purple grey or dark moss green.....4
3. Subterminal line on the upperside of forewing W-shaped between veins 2 and 5 .....*strigidisca* (MOORE)
- Subterminal line on the upperside of forewing slightly waved between veins 2 and 5 .....*stenoptera* SUGI
4. On the upperside of forewing, ground colour variable, blackish red-brown to light purplish grey; reniform stigma rather broad, its external margin defined by pure white.....*variabilis* sp. nov.
- On the upperside of forewing, ground colour dark moss green; reniform stigma very slender, edged externally with pale shade.....*muscipennis* sp. nov.
5. On the upperside of forewing, ground colour dark green, mixed with blackish scales; reniform stigma white, with small dark brown centre.....*hoenei* BOURSIN

- On the upperside of forewing, ground colour pale yellowish green, median area between ante- and postmedial lines reddish brown. . . . . 6
- 6. Small in size (length of forewing: 12–13 mm). On the upperside, subterminal line of forewing indistinct; ground colour of hindwing greyish brown. . . . .  
 . . . . . *endoi* sp. nov.
- Large in size (length of forewing: 15 mm). On the upperside, subterminal line of forewing whitish, rather distinct; ground colour of hindwing pale greyish brown, tinged with pink. . . . . *viridimaculata* sp. nov.

### *Isopolia strigidisca* (MOORE)

(Figs. 1–2, 13, 18)

*Apamea strigidisca* MOORE, 1881, Proc. zool. Soc. Lond., **1881**: 346, pl. 38, fig. 9.

*Pachypolia himalayensis* HAMPSON, 1906, Cat. Lepid. Phalaenae Brit. Mus., **6**: 312, fig. 101.

*Isopolia himalayensis*: WARREN, 1913, in SEITZ, Macrolepid. World, **11**: 110, pl. 14, line-e as *himalayca* [sic].

*Isopolia strigidisca*: BOURSIN, 1943, Z. wien. ent. Ges., **28**: 341, pl. 41, fig. 7, pl. 42, fig. 4; BOURSIN, 1952, *ibid.*, **37**: 135; BOURSIN, 1958, *ibid.*, **43**: 46, pl. 1, figs. 8, 9; SUGI, 1958, Tinea, **4**: 213, pl. 31, fig. 21; INOUE & SUGI, 1958, Check List Lepid. Japan, (5): 489; OGATA, 1958, in ESAKI *et al.*, Icones Heteroc. Japon. Col. Nat., [2]: 102, pl. 94, fig. 2054; SUGI, 1959, Tinea, **5**: pl. 39, fig. 5; SUGI, 1959, in INOUE *et al.*, Icon. Ins. Japon. Col. nat. ed., **1**: 120, pl. 79, fig. 10; SUGI, 1982, in INOUE *et al.*, Moths Japan, **1**: 735, **2**: 363, pl. 181, fig. 17.

*Morrisonia angarensis* DRAUDT, 1950, Mitt. münch. ent. Ges., **40**: 42, pl. 3, fig. 14.

*Male genitalia.* Uncus long, slightly broadened in middle portion, with square apex. Tegumen moderate, dorsal portion rather broad. Vinculum developed, V-shaped. Valva rather simple; costa smoothly incurved in basal 2/3, then obtusely angulate; ampulla large, rather broad, nearly straight, extending far beyond the apex of valva; cuculus membraneous; sacculus well developed, broad, with a sclerotized ridge extending to the base of ampulla. Juxta triangular, basal margin almost straight. Aedeagus slightly curved, coecum penis broadened; basal portion of everted vesica with sclerotized plate scattered with micro-spines, 3 to 6 round cornuti bearing acute apices present in the middle portion of dorsal pouch, and a mass of fine slender spines present in the distal portion of ventral pouch (the spine mass is usually fallen off during copulation).

*Female genitalia.* Papillae anales short, sclerotized, with long slender apophyses; 8th abdominal segment as long as papillae anales, apophyses very short, nearly 1/5 as long as posterior ones. Sterigma forming a deep invaginated duct with wide opening. Ductus bursae twice as long as sterigma, curved, well sclerotized dorsally, membraneous ventrally. Corpus bursae sclerotized in dorso-posterior portion, from which ductus seminalis arises, slightly constricted beyond middle, with 4 longitudinal signa.

*Material examined.* Nepal — 2♂, Hinku Himalay (2,780 m), Parbat District, Gandaki Zone, 19. X. 1981 (M. OWADA); 1♂, Deorali (3,100 m), Modi Khola Valley, Parbat District, Gandaki Zone, 20. X. 1981 (M. OWADA); 1♂ 10♀, Magarka Danda

(3,310 m), near Tinsang La, Dolakha District, Janakpur Zone, 12. XI. 1979 (M. OWADA); 18♂ 18♀, Dolangsa (2,600 m), Sindhu District, Bagmati Zone, 11. XI. 1979 (M. OWADA); 10♀, Durmthali (2,420 m), Sindhu District, Bagmati Zone, 13. XI. 1979 (M. OWADA); 1♀, Sete (2,600 m), Solukhumbu District, Sagarmata Zone, 12. X. 1979 (M. OWADA); 10♂ 6♀, Chauki (2,700 m), Terhathum District, Kosi Zone, 30. X. 1979 (M. OWADA); 3♂ 1♀, Basantpur (2,380 m), Terhathum District, Kosi Zone, 31. X. 1979 (M. OWADA); 1♀, Gunrase (2,300 m), Dhankuta District, Kosi Zone, 1. XI. 1979 (M. OWADA). India, West Bengal — 1♂, Darjeeling, 1. XI. 1981 (M. OWADA); 1♂, same locality, 9. XI. 1981 (M. OWADA); 4♂ 1♀, Tonglu (3,170 m), Darjeeling District, 2. XI. 1981 (M. OWADA); 18♂ 25♀, same locality, 6. XI. 1981 (M. OWADA); 4♂ 6♀, Sandakpuh (3,600 m), Darjeeling District, 3–4. XI. 1981 (M. OWADA); 16♂ 23♀, Gairibas (2,680 m), Darjeeling District, 5. XI. 1981 (M. OWADA); 6♂ 9♀, Tiger Hill (2,570 m), near Darjeeling, 8. XI. 1981 (M. OWADA). Japan — 3♀, Hikosan, Fukuoka Pref., 14. XI. 1955 (H. KUROKO); 1♂, Nosegawa, Yoshino, Nara Pref., 5. XI. 1971 (M. OWADA); 5♂ 4♀, Kabe, Itadori, Mugi, Gifu Pref., 26. X. 1975 (N. BITO); 2♂, Takao-san, Tokyo, 9. XI. 1952 (S. SUGI); 1♂, same locality, 13. XI. 1963 (M. OWADA); 1♂, same locality, 9. XII. 1950 (T. HARUTA).

*Distribution.* Central and eastern Nepal, India (West Bengal), Sikkim, China (Lichiang), and Japan (Yakushima Is., Kyushu, Shikoku, and central and western Honshu).

*Remarks.* Japanese specimens (Fig. 2) can be distinguished from Himalayan ones (Fig. 1) by the following characters: on the upperside, the ground colour is darker in both the wings and more tinged with purple in forewing; subterminal line of forewing is usually indistinct between costa to vein 7, while it is traceable in the Himalayan specimens.

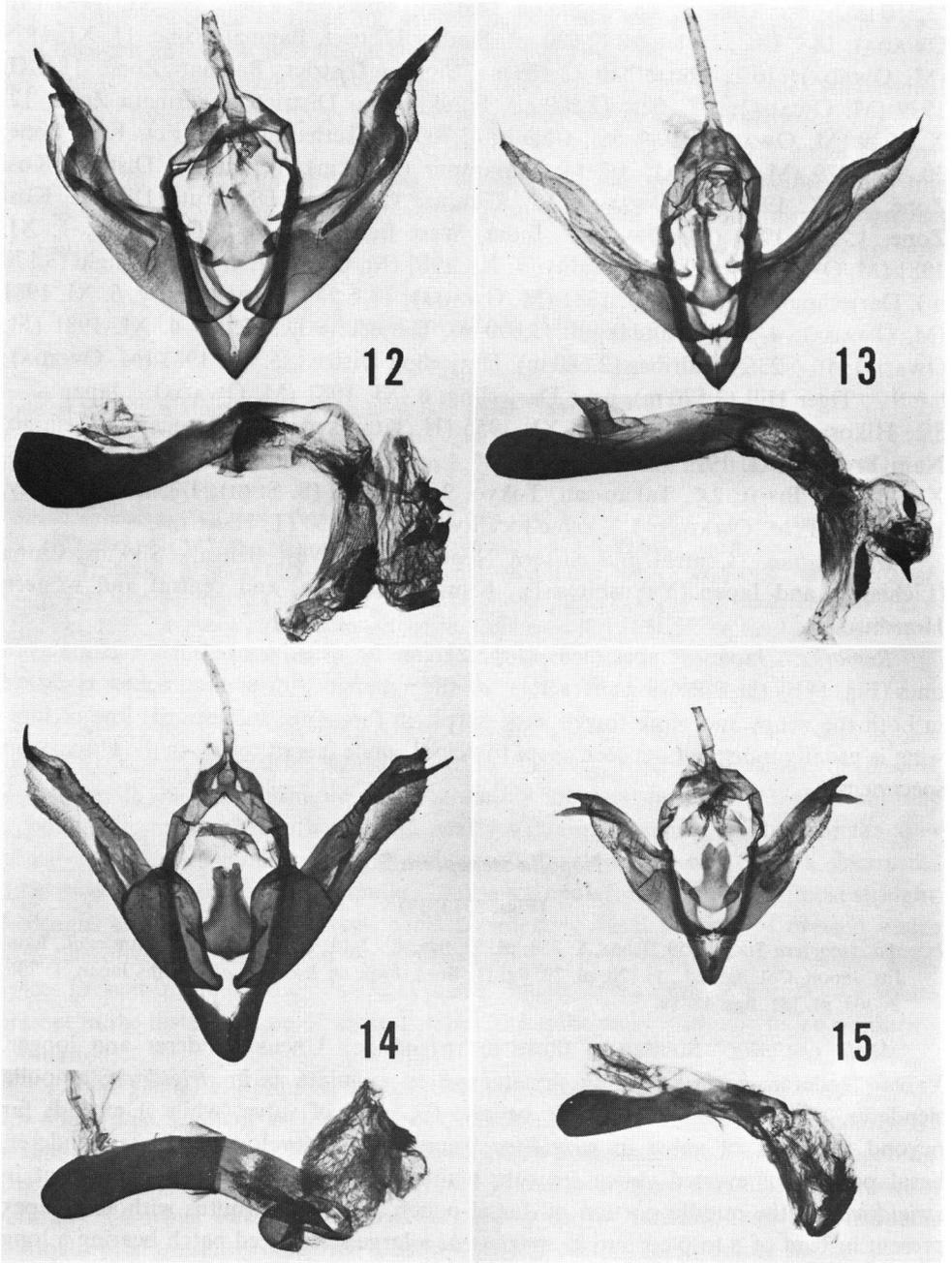
### *Isopolia stenoptera* SUGI

(Figs. 3, 13, 19)

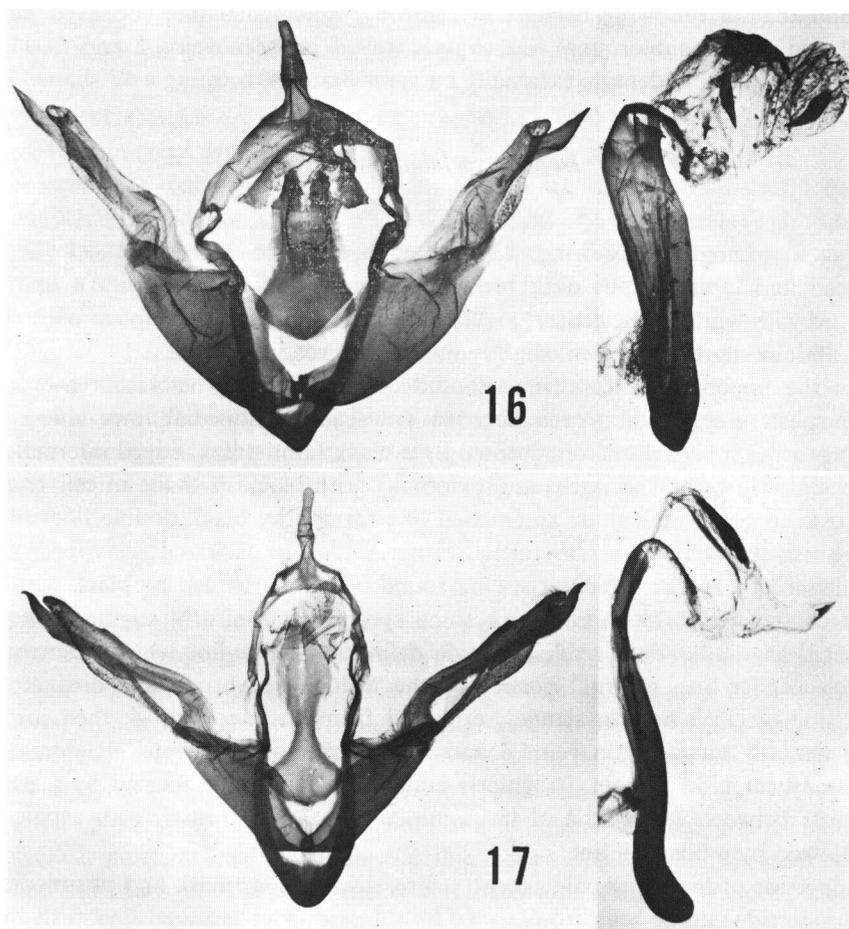
*Isopolia stenoptera* SUGI, 1959, *Tinea*, 5: 288, pl. 39, figs. 4, 12–13; SUGI, 1959, in INOUE *et al.*, *Icon. Ins. Japon. Col. nat. ed.*, 1: 120, pl. 79, fig. 11; SUGI, 1982, in INOUE *et al.*, *Moths Japan*, 1: 736, 2: 363, pl. 181, figs. 18–19.

*Male genitalia.* Similar to those in *strigidisca*. Uncus slenderer and longer. Valva slenderer; costa smoothly sinuate, not so angulate as in *strigidisca*; ampulla slenderer, curved, extending a little beyond the apex of valva, while it extends far beyond the apex of valva in *strigidisca*; sacculus less developed. Juxta slenderer, basal portion of everted vesica smooth, without micro-spines which are present in *strigidisca*; in the middle portion of dorsal pouch, a round cornutus with acute apex present instead of 3 to 6 cornuti in *strigidisca*; a large sclerotized patch bearing a long acute projection, while it bears a much shorter projection in *strigidisca*.

*Female genitalia.* Very similar to those in *strigidisca*. 8th abdominal segment longer, apophyses anteriores about 1/3 as long as apophyses posteriores instead of



Figs. 12-15. Male genitalia. — 12, *I. strigidisca* (MOORE). — 13, *I. stenoptera* SUGI, paratype. — 14, *I. variabilis* sp. nov., holotype. — 15, *I. muscipennis* sp. nov., holotype.



Figs. 16-17. Male genitalia. — 16, *I. hoenei* BOURSIN. — 17, *I. endoi* sp. nov., holotype.

1/5 in *strigidisca*. Corpus bursae markedly constricted at posterior 2/3, anterior membranous portion more rounded than that in *strigidisca*.

*Material examined.* Holotype of *Isopolia stenoptera* SUGI: ♂, labeled "Nov. 7, 1953, Mt. Mitake, Inasa-gun, Shizuoka-ken, Coll. Y. Saitoh/Holotype, *Isopolia stenoptera* Sugi, 1959 [on red label]," preserved in the collection of S. SUGI, Tokyo; paratypes: 2♂ 1♀, same data as holotype, preserved in the National Science Museum (Nat. Hist.), Tokyo (1♂ 1♀), and in SUGI's collection (1♂). Other material — 2♂, Takihara, Omiya, Mie Pref., 23. XI. 1953 (M. SAKABE); 1♂, same locality, 23. XI. 1960 (M. SAKABE).

*Distribution.* Japan (Kyushu, Shikoku, and southern Pacific coast of Honshu).

*Remarks.* Very similar in wing maculation to *I. strigidisca*, but distinguished from it by the following characters: on the upperside, the ground colour of forewing

paler and that of hindwing darker; in forewing, antemedial line concaved between veins 2 and 3, and subterminal line slightly waved between veins 2 and 5, while in *strigidisca* it is acutely dentate externally on veins 3 and 4, forming a W-shape.

*Isopolia variabilis* sp. nov.

(Figs. 4-7, 14, 20)

♂ & ♀. Length of forewing: 13-15 mm; expanse: 26-32 mm.

Head and labial palpus dark brown; patagium dark brown, with a fine black line edged with white at the centre; tegula dark brown, dorsal crest tipped with whitish scales; abdomen greyish brown, slightly mixed with reddish scales.

On the upperside of forewing, ground colour variable, blackish red-brown to light purplish grey, median area between ante- and postmedial lines always dark reddish brown; subbasal line represented by a black faint streak, edged internally with whitish scales in some specimens and externally with blackish shade in cell 1, arising from costa to submedian fold; antemedial line formed by black double lines filled in with whitish scales in some specimens, rather smoothly excurved; claviform stigma large, defined by black; orbicular stigma round or ovate, defined by black with inner whitish shade, with whitish centre in some specimens; reniform stigma moderately constricted at middle, dark reddish brown, defined by white line which is surrounded by black slender line, external portion of the whitish line broad and distinct; postmedial line blackish brown, slender, excurved from costa to vein 4, then incurved, weakly dentate outwards on veins 4 and 5; subterminal line white, slender, slightly broadened near hind margin, irregularly sinuate; terminal line formed by a series of black dots between veins; cilia of the same colour as the ground, with a pale basal line followed by a blackish line.

Upperside of hindwing pale greyish ochre, discocellular mark and postmedial line of the underside can be seen from above by transparency; terminal line dark brown; cilia pale ochre, with a pale basal line followed by a blackish line.

Underside of wings pale reddish ochre, mixed with blackish scales; forewing darker than hindwing; discocellular marks distinct; postmedial lines indistinct in forewing and distinct in hindwing; terminal lines and cilia as on the upperside.

*Male genitalia.* Similar to those in *I. strigidisca* and *I. stenoptera*. Uncus slender as in *stenoptera*. Tegumen rather narrow; vinculum U-shaped. Valva straight; costa well sclerotized; ampulla curved, intermediate in shape and length between those of *strigidisca* and *stenoptera*; sacculus markedly developed. Juxta as in *strigidisca*, basal margin rounded. Aedeagus curved, coecum penis not so broadened as in *strigidisca*; everted vesica with large sclerotized swelling at base, without prominent cornutus except for a mass of fine slender spines.

*Female genitalia.* Papillae anales not so sclerotized as those of *strigidisca* and *stenoptera*; apophyses anteriores long, slightly shorter than apophyses posteriores. Invaginated sterigma as in *strigidisca*. Ductus bursae short, slightly longer than

sterigma, nearly straight, sclerotized. Corpus bursae weakly constricted beyond middle, posterior portion not so sclerotized as in *strigidisca*.

*Holotype*. ♂, labeled "E NEPAL, Kosi Zone, Terhathum, Chauki 2,700 m, 30. X. 1979, M. OWADA/Genitalia Slide No. NSMT 1722," preserved in the National Science Museum (Nat. Hist.), Tokyo.

*Paratypes*. Nepal — 1♂, Dolangsa (2,600 m), Sindhu District, Bagmati Zone, 11. XI. 1979 (M. OWADA). India, West Bengal — 1♀, Sandakpuh (3,600 m), Darjeeling District, 3. XI. 1981 (M. OWADA); 1♂ 2♀, Tonglu (3,170 m), Darjeeling District, 6. XI. 1981 (M. OWADA).

*Distribution*. Eastern Nepal, and India (West Bengal).

*Remarks*. Exceedingly variable species as shown in Figs. 4–7, but easily distinguished from the other species by its ground colour on the upperside.

Judging from the genitalic characters, this species is fairly related to the preceding two species, though its wing maculation is rather different from those of the latter.

### *Isopolia muscipennis* sp. nov.

(Figs. 8, 15, 21)

♂ & ♀. Length of forewing: 12–14 mm; expanse: 25–27 mm.

Head and patagium moss green, with a strong black line in the latter; labial palpus dark brown; tegula moss green, edged with dark brown hair; thorax light moss green, dorsal crest tipped with yellowish scales; abdomen dark brown, mixed with ochreous scales, with faint pale segmental lines, anal tuft reddish ochre.

Upperside of forewing dark moss green, veins stained with black; subbasal line represented by two short black striae from costa to submedian fold, shaded externally with blackish green at cell 1; antemedial line double, black, slightly excurved, the inner line indistinct in some specimens, the outer one distinct, slender; claviform stigma very short, defined by black; orbicular stigma large, defined by black, with brownish green centre; reniform stigma slender, slightly constricted at middle, coloration as in the orbicular stigma, edged externally with pale slender shade; postmedial line double, black, bent outwards below costa, angulate at vein 4, then incurved to inner margin; external area of postmedial line brownish green; subterminal line pale ochreous green, faint, almost parallel to postmedial line; terminal line black, slender; cilia dark moss green, with a pale basal line.

Upperside of hindwing greyish brown, discocellular mark and postmedial line of the underside detectable; terminal line black; cilia reddish ochre, with a blackish line.

Underside of wings pinkish grey-ochre, mixed with blackish scales, inner areas grey; discocellular marks indistinct in forewing and distinct in hindwing; postmedial lines dark brown, dull, distinct in both the wings.

*Male genitalia*. Small in size. Uncus, tegumen and vinculum as in *strigidisca*. Valva nearly straight; costa weakly excurved, well sclerotized; ampulla long, broad, curved ventrally; cuculus somewhat sclerotized, pointed at apex; sacculus well devel-

oped. Juxta as in *variabilis*. Aedeagus nearly straight, coecum penis as in *variabilis*; everted vesica with a mass of micro-spines at base, without cornutus except for a mass of fine slender spines which are longer and more in number than those in *variabilis*.

*Female genitalia.* Papillae anales slenderer, not so sclerotized as those in *strigidisca* and *stenoptera*, somewhat longer than in *variabilis*; apophyses anteriores with markedly broadened tips, about 4/7 as long as apophyses posteriores. Invaginated sterigma as in *strigidisca*. Ductus bursae short, straight, not sclerotized. Corpus bursae well constricted beyond middle; posterior portion slightly sclerotized, with many irregular furrows, anterior portion rounded.

*Holotype.* ♂, labeled "E NEPAL, Bagmati Zone, Sindhu, Dolangsa 2,600 m, 11. XI. 1979, M. OWADA/Genitalia Slide No. NSMT 1707," preserved in the National Science Museum (Nat. Hist.), Tokyo.

*Paratypes.* Nepal — 1♂ 1♀, same data as holotype; 1♀, Gunrase (2,300 m), Dhankuta District, Kosi Zone, 1. XI. 1979 (M. OWADA). India, West Bengal — 1♂, Tonglu (3,170 m), Darjeeling District, 6. XI. 1981 (M. OWADA).

*Distribution.* Eastern Nepal, and India (West Bengal).

*Remarks.* This species is easily distinguished from the other species by its moss green ground colour on the upperside.

Although the female genitalia are somewhat different from those of *I. variabilis*, the two species are considered mutually related in view of the similarity of male genitalic characters.

### *Isopolia hoenei* BOURSIN

(Figs. 9, 16, 22)

*Isopolia hōnei* BOURSIN, 1958, Z. wien. ent. Ges., **43**: 45, pl. 1, figs. 1–3, 7; SUGI, 1959, in INOUE *et al.*, Icon. Ins. Japon. Col. nat. ed., 1: 120, pl. 79, fig. 12.

*Isopolia hoenei*: SUGI, 1982, in INOUE *et al.*, Moths Japan, 1: 736, 2: 363, pl. 181, fig. 20.

*Panolis flammea* f. *griseovariegata*: MATSUMURA, 1931, 6000 illust. Ins. Japan: 826–827, fig. in p. 827, nec GOEZE, 1781.

*Male genitalia.* Similar to those of the four preceding species, but rather stout. Uncus, tegumen and vinculum as in *strigidisca*. Valva straight, very broad in basal portion, gradually narrowed towards apex; costa slightly swollen in middle portion; ampulla broad, curved, far extending beyond the apex of valva; sacculus well developed. Juxta very broad, with obtusely angulate basal margin and with bifurcate apex. Aedeagus nearly straight, coecum penis not broadened; everted vesica with long sclerotized ridge at base, fine slender spines in apical portion longer and less in number than those in *strigidisca*, two large horn-like and one minute cornuti present.

*Female genitalia.* Papillae anales slender, apophyses anteriores slender, about a half as long as apophyses posteriores. Invaginated sterigma very long, its length longer than the width of opening. Ductus bursae short, curved, markedly flattened. Corpus bursae heavily constricted near middle, its posterior portion well sclerotized,

anterior membranous portion round.

*Material examined.* Japan — 1♀, Mt. Shiramine, Sakaide, Kagawa Pref., 15. XI. 1972 (T. MASUI); 2♂, Kurumatsukuri, Ibaraki, Osaka Pref., 10. XII. 1977 (S. KINOSHITA); 1♀, Gifu Park, Gifu Pref., 20. XI. 1963 (M. OKADA); 1♂ 2♀, same locality, 23–24. XI. 1962 (M. OKADA); 1♀, same locality, 28. XI. 1963 (M. OKADA); 1♂ 1♀, same locality, 2–3. XII. 1963 (M. OKADA); 1♂, same locality, 10. XII. 1962 (M. OKADA); 1♀, same locality, 14. XII. 1967 (M. OKADA); 1♀, Mitahora, Gifu, Gifu Pref., 28. XI. 1972 (H. ENDO); 1♂ 1♀, Okino, Tanigumi, Motosu, Gifu Pref., 16. XI. 1979 (T. MIZUNO); 1♂ 1♀, Shinshiro, Aichi Pref., 26–27. XI. 1957 (S. KWAN); 1♂, Takao-san, Tokyo, 26. XI. 1927 (A. KAWADA); 1♀, same locality, 28. IV. 1927<sup>2)</sup> (N. INABA).

*Distribution.* China (Kwangtung), and Japan (Kyushu, Shikoku, and western and central Honshu).

*Remarks.* This species is characterized by the dark green ground colour on the upperside and the markedly large white reniform stigma (Fig. 9).

Judging from the female genitalia, this and the following two species are considered to form a group separated from the preceding four species by the elongated sterigma, of which the longitudinal length is larger than the width of opening, and by the flattened ductus bursae which is markedly curved ventrally. On the other hand, the sterigma is short, its length is smaller than the width of opening, and the ductus bursae is straight or moderately curved and not flattened in the latter.

### *Isopolia endoi* sp. nov.

(Figs. 10, 17, 23)

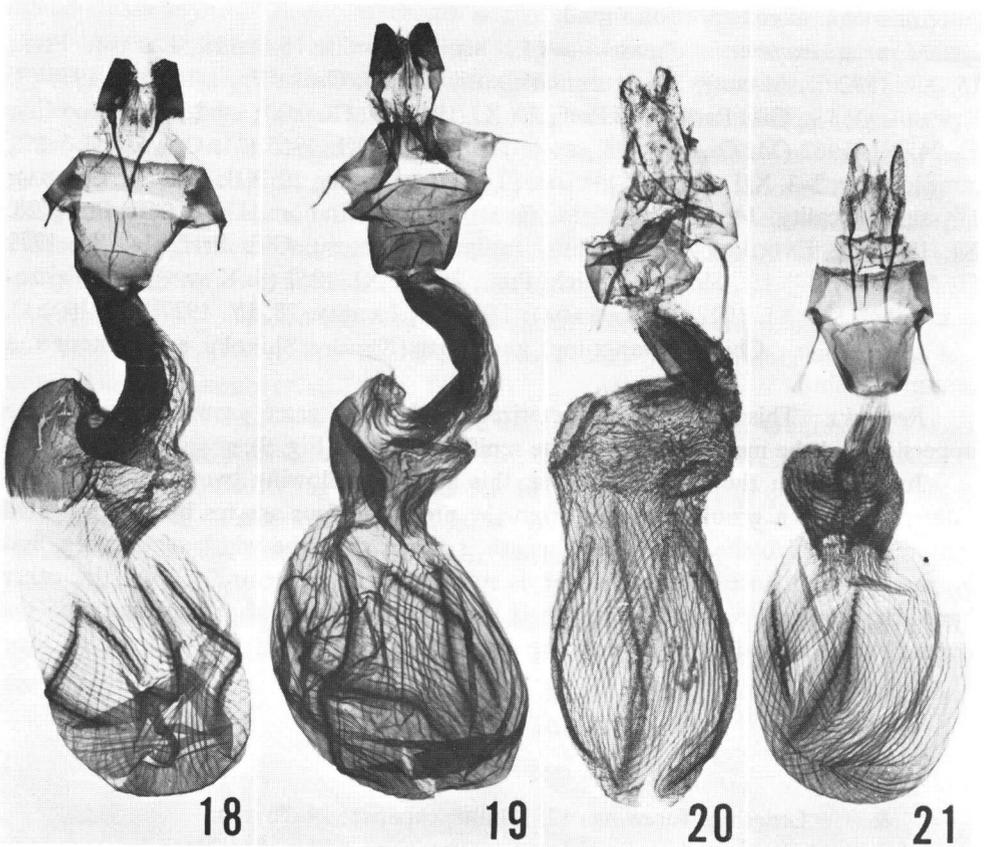
♂ & ♀. Length of forewing: 12–13 mm; expanse: 24–26 mm.

Head and thorax pale yellowish green, patagium with a fine black line near tip; labial palpus brown; abdomen greyish ochre, slightly tinged with red.

Upperside of forewing yellowish green, median area between ante- and post-medial lines reddish brown; subbasal line represented by two short black striae from costa to submedian fold, shaded externally with black at cell 1; antemedial line double, blackish brown, arising obliquely outwards from costa, straight to vein 1, then angulate inwards, the inner line usually indistinct; claviform stigma very short, defined by dark brown; orbicular stigma defined by dark brown, usually indistinct; reniform stigma pale reddish green, with brownish shade, defined by black, broad, subrectangular, not constricted at middle; postmedial line dark brown, double, bent outwards below costa, angulate at vein 7, then straightly down to inner margin, irregularly waved; subterminal line faint, represented by double brownish shades, indistinct, nearly parallel to postmedial line; terminal line formed by a dark brown slender line or by a series of dark brown dots; cilia pale yellowish green, mixed with brownish scales.

Upperside of hindwing greyish brown, discocellular mark and postmedial line of the underside detectable; terminal line slightly darker than the ground; cilia as in

2) This collecting date must be an error.



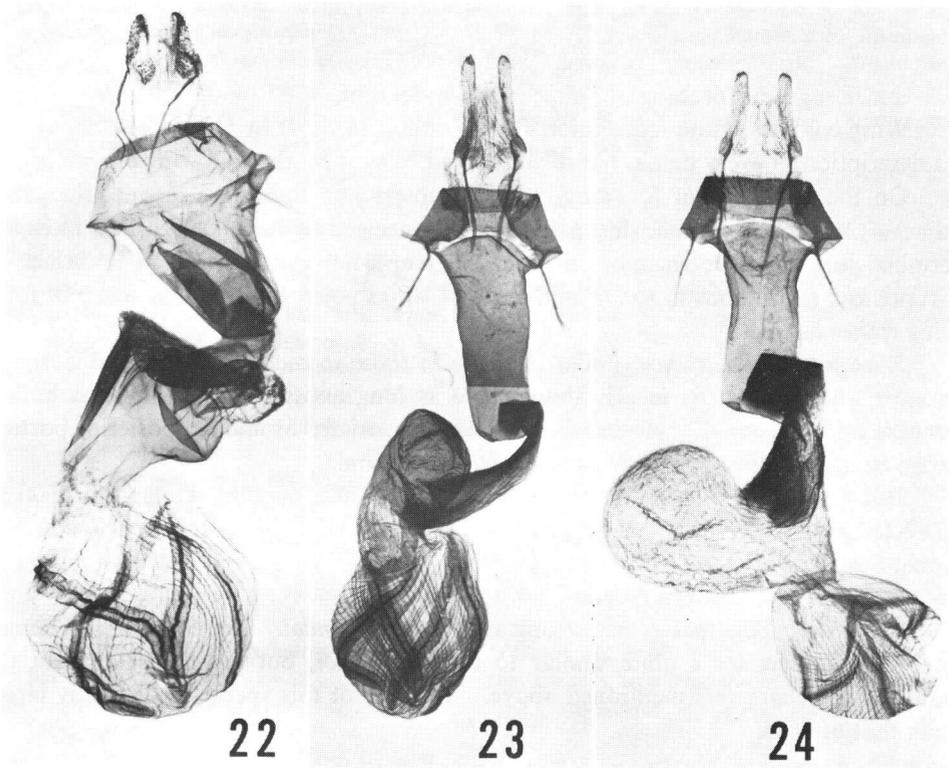
Figs. 18–21. Female genitalia. — 18, *I. strigidisca* (MOORE). — 19, *I. stenoptera* SUGI, paratype. — 20, *I. variabilis* sp. nov., paratype. — 21, *I. muscipennis* sp. nov., paratype.

forewing.

Underside of wings reddish ochre, mixed with blackish scales; discocellular marks indistinct in forewing, rather distinct in hindwing; postmedial lines blackish brown, dull, distinct in both the wings.

*Male genitalia.* Uncus rather short, with slightly rounded apex. Tegumen very narrow; vinculum U-shaped. Valva very slender, straight; costa slightly sinuate; ampulla similar in shape to that in *hoenei*, but slenderer; sacculus much slenderer than that in *hoenei*. Juxta markedly elongated, constricted at middle, basal margin rounded. Aedeagus slender, sinuate; coecum penis slightly broadened; everted vesica with a small spinous cornutus and with a mass of fine slender spines.

*Female genitalia.* Papillae anales slender, much elongated; apophyses anteriores about  $\frac{3}{4}$  as long as apophyses posteriores. Invaginated sterigma very long, its length about 2.25 times as long as its opening. Ductus bursae long, curved, markedly flat-



Figs. 22–24. Female genitalia. — 22, *I. hoenei* BOURSIN. — 23, *I. endoi* sp. nov., paratype. — 24, *I. viridimaculata* sp. nov., holotype.

tened, as long as sterigma. Corpus bursae slightly constricted beyond middle, posterior portion sclerotized, anterior portion rounded.

*Holotype*. ♂, labeled “TAIWAN, HUALIEN: Tayuling [2,500 m], 17. X. 1977, H. ENDO/Genitalia Slide No. NSMT 1705,” preserved in the National Science Museum (Nat. Hist.), Tokyo.

*Paratypes*. Taiwan — 3♀, same data as holotype; 1♀, Alishan (2,200 m), Chiayi Pref., 20. X. 1977 (H. ENDO).

*Distribution*. Taiwan.

*Remarks*. This species is the smallest in size of all the known species of the genus, and is easily distinguished from the others by its yellowish green ground colour on the upperside and broad reniform stigma, with the exception of the following species which is very similar in wing maculation.

Judging from the genitalic characters, this species is closely related to *I. hoenei*.

*Isopolia viridimaculata* sp. nov.

(Figs. 11, 24)

♀. Length of forewing: 15 mm; expanse: 29 mm.

Wing coloration and maculation closely similar to those in *I. endoi* and answering its description in every detail, but distinguished from it by the following characters:

On the upperside of forewing, whitish subterminal line more distinct than that in *endoi*; upperside of hindwing paler and more tinged with pink than that in *endoi*, terminal line dark brown, more distinct, interrupted by veins, while it is rather indistinct and continuous in *endoi*; underside of wings paler, discocellular mark of forewing rather distinct.

*Female genitalia.* Very similar in shape to those in *endoi*. Invaginated sterigma broader and shorter, its length about twice as long as its opening. Ductus bursae broader and longer. Corpus bursae markedly constricted at middle, posterior portion large, rounded, almost as large as the anterior portion.

*Holotype.* ♀, labeled "E NEPAL, Bagmati Zone, Sindhu, Dolangsa 2,600 m, 11. XI. 1979, M. OWADA/Genitalia Slide No. NSMT 1754," preserved in the National Science Museum (Nat. Hist.), Tokyo.

*Distribution.* Eastern Nepal.

*Remarks.* This species has strong affinity with *I. endoi*. The external and female genitalic characters are quite similar to those in *endoi*, but distinguished from the latter by the characters mentioned above. The size of this species is distinctly larger than that of *endoi*.

### Acknowledgements

I wish to express my hearty thanks to Dr. Yoshihiko KUROSAWA and Dr. Shun-ichi UENO of our museum for giving me the opportunity to participate in the Nepal-Himalayan expeditions and for reading and criticizing the manuscript. I am deeply indebted to Mr. Shigero SUGI, Tokyo, for his invaluable advice and guidance and for giving me the privilege of studying his collection inclusive of the type-series of *Isopolia stenoptera*. I have also to express my gratitude to all the members of the expeditions for their kind aid and encouragement in the field survey, especially to Mr. Yoshiaki NISHIKAWA of Ohtemon-Gakuin University, who kindly supplied me with data of temperature change during the night collecting on November 12th, 1979. My thanks are also due to Messrs. Hiroshi ENDO, Naruhito BITO and Toshihiko MIZUNO, Gifu, Soichiro KINOSHITA, Osaka, and Takehiko MASUI, Takamatsu, for gift or loan of material from Taiwan and Japan.

### References

- BOURSIN, Ch., 1943. Über die systematische Stellung einiger Typen von MOORE aus der Sammlung des Zoologischen Museums Berlin, nebst Beschreibung einer neuen Gattung. Beiträge zur

- Kenntnis der „Agrotidae-Trifinae“ XXXIII. *Z. wien. ent. Ges.*, **28**: 337–343, pls. 41–42.
- BOURSIN, Ch., 1952. Literaturreferat. Prof. Dr. M. DRAUDT, „Beiträge zur Kenntnis der Agrotiden-Fauna Chinas. Aus den Ausbeuten Dr. H. HÖNE's. (Beitrag zur Fauna Sinica).“ *Z. wien. ent. Ges.*, **37**: 134–135.
- 1958. Zwei neue Cuculliinae aus Ostasien. Aus Dr. H. HÖNE's Ausbeuten. (Beiträge zur Kenntnis der „Noctuidae-Trifinae“, XCVI). *Ibid.*, **43**: 45–48, pl. 1.
- DRAUDT, M., 1950. Beiträge zur Kenntnis der Agrotiden-Fauna Chinas. Aus den Ausbeuten Dr. H. HÖNE's (Beitrag zur Fauna Sinica). *Mitt. münch. ent. Ges.*, **40**: 1–174, pls. 1–18.
- HAMPSON, G. F., 1906. Noctuidae, Cucullianae. *Cat. Lepid. Phalaenae Brit. Mus.*, **6**: i–xiv+1–532, pls. 96–108.
- INOUE, H., & S. SUGI, 1958. Noctuidae. *Check List Lepid. Japan*, (5): 431–619.
- MATSUMURA, S., 1931. 6000 Illustrated Insects of Japan-Empire. 2+2+3+1497+191 pp., 10 pls. Tokyo, Tōkōshoin. (In Japanese.)
- MOORE, F., 1881. Descriptions of new genera and species of Asiatic nocturnal Lepidoptera. *Proc. zool. Soc. Lond.*, **1881**: 326–380, pls. 37–38.
- OGATA, M., 1958. Noctuidae. In ESAKI, T., et al., *Icones Heteroc. Japon. Col. Nat.*, [2]: 55–197, pls. 83–119. (In Japanese.)
- SUGI, S., 1958. Notes on some genera and species of the Japanese Cuculliinae (Lepidoptera, Noctuidae). *Tinea*, **4**: 200–222, pls. 26–31.
- 1959. Descriptions of some new species of the Noctuidae (Lepidoptera). *Ibid.*, **5**: 286–292, pl. 39.
- 1959. Noctuidae. In INOUE, H., et al., *Icon. Ins. Japon. Col. nat. ed.*, **1**: 105–159, pls. 64–106. (In Japanese.)
- 1982. Noctuidae, excluding Herminiinae. In INOUE, H., et al., *Moths Japan*, **1**: 669–913, **2**: 344–405, 461–466, pls. 164–223, 229, 355–380. (In Japanese, with English synopsis.)
- WARREN, W., 1912–1938. Noctuidae. In SEITZ, A. (ed.), *Macrolepid. World*, **11**: 31–252, pls. 5–30, 32–42, 44–51.
- YOSHIMOTO, H., 1982. Notes on the genus *Epipsestis*, with descriptions of three new species from Nepal (Lepidoptera: Thyatiridae). *Tyo Ga*, **32**: 117–137, 47 figs.

