New and revised eupitheciine species (Geometridae, Larentiinae) from Hong Kong and South East Asia

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Abstract A number of eupitheciine taxa from Hong Kong and elsewhere in SE Asia are examined and their taxonomic status is discussed. A new genus, Sigilliclystis, is erected, and a new species described in it. Members of the errabunda group are defined, and a new species described. Gymnoscelis subpumilata Inoue is assigned to Spiralisigna, and a new species in the same genus is described. The status of Axinopiera subcostalis is examined and a new species is described. A new species of Eupithecia is described.

Key words Lepidoptera, Geometridae, Eupitheciini, Sigilliclystis gen. nov., Sigilliclystis kendiicki sp. nov., Sigilliclystis insigillata (Walker), Sigilliclystis encleta (Prout), Sigilliclystis lunifera (Holloway), Bosara janae sp. nov., Bosara errabunda (Prout), Bosara albitoralis (Prout), Bosara exortiva (Prout), Bosara subrobusta (Inoue), Spiralisigna gloriae sp. nov., Spiralisigna subpumilata (Inoue), Eupithecia sekkongensis sp. nov.

Introduction

The eupitheciines are an extremely diverse group in East and South East Asia, and knowledge of them is patchy. The genus Eupithecia from Japan and Taiwan has been thoroughly studied (Inoue, 1979, 1980 and 1988). Vojnits has produced numerous papers and described a very large number of new species of Eupithecia from China and Northern and Central Asia. The smaller eupitheciines in the genus Chloroclystis sensu lato from Japan have also been well studied (Inoue et al., 1982). More recently, Holloway (1997) treated the Bornean species and partially revised the generic level taxonomy of the tribe. In particular, he defined the genus Chloroclystis very much more narrowly, and revived a number of older genera and added some new ones to take care of groups which were excluded by his new definition. However very little work has been done on genera other than Eupithecia within the tribe from elsewhere on the mainland of Asia and particularly China. It is therefore not surprising that work on a checklist of Hong Kong moths has produced a number of new taxa, and a number of others in need of revision. The purpose of this paper is both to describe the new taxa and to give them a place in the revised scheme devised by Holloway. This has necessitated the erection of one new genus, and the definition of a distinct group (the errabunda group) within another, Bosara. Collections referred to in this paper: BMNH—Natural History Museum, London; ZCAS—Zoological Laboratory, Chinese Academy of Sciences, Beijing; EBHKU—Department of Ecology & Biodiversity, The University of Hong Kong, Hong Kong.

The insigillata Walker group

Chloroclystis insigillata was described by Walker in 1862 from Australia, where it is widespread: it also occurs on Norfolk Island. Subsequently two further closely related species were described, encleta Prout, 1934 from Vanuatu, Samoa, Fiji and the Cook Islands, and

larifera Holloway, 1979 from New Caledonia. A further undescribed species in the same group flies in Hong Kong, and will be described below. This group of closely related insects has a number of common features that do not appear to fit any of Holloway’s generic concepts. I therefore propose a separate genus to contain them, as follows:

Sigilliclystis gen. nov.

Type species. Chloroclystis insigillata Walker, 1862.

Gender. Feminine.

Members of the genus are white or grey in ground colour with fine, closely spaced fasciae with
a sharp angle close to the costa. The main distinguishing feature in the male is a semicircular patch of scent scales in the centre of the forewing costa, in some species extending further into the centre of the wing. Antennae in the males are finely ciliate, simple in the females. The male genitalia are very distinctive and very similar in all four species: the valve is pinched in the centre, with a clear separation between sacculus and cucullus. The saccus is robust and oblong, with two stout curved spines on each of its ventral angles. The tegumen is expanded and hooded, leaving only a small part of the uncus free. The eighth sternite is poorly sclerotised, but bears a complex series of membranous lobes ornamented with long hair-scales. The female genitalia are slightly more diverse, but all have a characteristic off-centre attachment of the ductus bursae to the bursa, in the more extreme cases (insigillata and lunifera) giving the appearance of a yo-yo. The affinities of the genus are not entirely clear, but the male genitalia share some features of those of Gymnoseels, in particular the central longitudinal bar of thickening on the saccus noted by Holloway (1997).

The genus consists of insigillata (Walker), enteta (Prout), and lunifera (Holloway), combs nov. and

**Sigilliclystis kendricki** sp. nov.

Male (Fig. 1). Forewing 9 mm; very similar to insigillata (Walker), but duller, with fasciae less clearly marked; ground colour grey-brown; base of forewing and costa with a light suffusion of red scales; forewing and hindwing lightly dusted with brown scales forming narrow and ill-defined fasciae; hindwing with a slightly better defined pale double post-medial; costal scent scales fawn.

Female (Fig. 2). Forewing 10 mm; broadly similar, lacking the costal scent scales; red scales on base and costa of forewing more prominent; pale postmedials fairly well defined on forewing as well as hindwing.

Male genitalia (Fig. 8). Very similar to insigillata (Fig. 9), but uncus finer, and tegumen less distinctly separate from inflated vinculum. Valves placed relatively more dorsally on vinculum.

Female genitalia (Fig. 10). Bursa copulatrix much less strongly ornamented with spines, and less robust than in insigillata (Fig. 11).


Range. Hong Kong, doubtless also extending onto the Chinese mainland.

Etymology. The species is named in recognition of the work done on Hong Kong moths by Roger Kendrick.

**The errabunda group**

Prout (1958) described three new taxa in Chloroclystis, errabunda (Taiwan), albitoralis (S.
India) and *exortiva* (Rossel I., New Guinea), as subspecies of *infusata* Walker. Holloway (1997) transferred *infusata* to *Axinoptera*, and elevated Prout's three subspecies to the level of species, noting that the genitalia indicated that they did not belong to *infusata*, and possibly not in *Axinoptera*. *C. errabunda* has now also been found in Hong Kong and in Hainan Island, South China.

In order to try to define this group, I have examined related material in the BMNH. This has revealed a further undescribed species in the same group from Sulawesi, and also that the taxon *subrobusta* Inoue is closely related. This was originally described in *Eupithecia* (Inoue, 1988), and subsequently transferred to *Chloroclystis* by Heppner and Inoue (1992). As Holloway noted, the genitalia of this group have little in common with the type species of *Axinoptera*, lacking the divided valve and having large octavals in the form of two stout spines projecting from the eighth sternite.

The group appear to be close to the concept of the genus *Bosara*, as revised by Holloway. Though lacking the sexual dimorphism, they share the general coloration, and the doubly angled postmedial. The male genitalia have strong octavals, but the valves are entire, without the saccular extension noted by Holloway in most other species of this genus. The hood of the tegumen is present, most clearly in *albitornalis*, but it is reduced, and the uncus correspondingly longer. The female genitalia of the genus as defined by Holloway are fairly diverse, but those of *errabunda*, the only species of this group examined, are consistent with Holloway's definition, having a lightly spined bursa. I therefore tentatively place the group in *Bosara*, though noting that further study of the Asian species may show that a separate genus is required.
The external pattern, described by Prout, is very similar in all the species, which are probably externally indistinguishable, except for subrobusta. Diagnosis is otherwise mainly by the male genitalia. The group consists of the following:

**Bosara errabunda** (Prout, 1958), **comb. nov.**


Diagnosis. Male genitalia (Fig. 12). Valves tapering gradually; uncus relatively long and thin, like a curved needle; saccus curved; octavals moderately stout, with bases relatively close together, curved outwards close to the bases.

Material examined. 1 ♂, 4. vi. 1997, leg. G. T. Reels, 2 ♀, vi. 1993 and undated, leg. A. C. Galsworthy, all Hong Kong, BMNH; 1 ♀, 25. vii. 1997, Hong Kong, leg. R. C. Kendrick, EBHKU; 1 ♂, 6. v. 1984, Hainan Island, ZCAS; Prout’s type series in BMNH, including BM Geometrid slides nos 19370 (♂), and 19371 (♀).

Range. Taiwan, Hong Kong, Hainan Island.

**Bosara albitornalis** (Prout, 1958), **comb. nov.**


Diagnosis. A darker, more contrasty species, but essentially with identical patterns. Male genitalia (Fig. 13) with longer valves, tapering slightly on the ventral edge from about one half; hood of tegumen more extensive, with uncus shorter and blunter; octavals massive with thick bases, spreading at an angle of about 30 degrees.

Material examined. Prout’s type series in BMNH, including BM Geometrid slide no. 18990 (♂).

Range. Sri Lanka, Southern India.

**Bosara exortiva** (Prout, 1958), **comb. nov.**


Diagnosis. Male genitalia (Fig. 14). Very similar to errabunda, but saccus wider and squarer. Uncus is similar in shape to that of errabunda, but longer, with the tegumen hood tapering more gradually. Octavals moderately stout, both curving in the same direction, parallel to one another.

Material examined. Prout’s type series in BMNH, including BM Geometrid slide no. 19484 (♂); 1 ♂, Dampier I, Meek’s expedition, ii–iii. 1914; 1 ♂, Mailu, British New Guinea, vii. 1895, both Rothschild bequest BM 1939-1, BMNH.

Range. New Guinea, Rossel I., Rook I.

**Bosara janae** sp. nov.

Male (Fig. 3). Forewing 9 mm; external pattern identical to errabunda, but ground colour greyish rather than yellow brown.

**Female. Unknown.**

Male genitalia (Fig. 15). Sacculus with a pronounced flange, distinct from any other member of the group. The tegumen and uncus are similar to *errabunda*, but with the uncus slightly less fine. Octavals asymmetrical, one placed more distally relative to the other,
diverging distally.

Holotype. ♂, G. Tompoe, Paloe, W. Celebes 2,700 ft, i. 1937 (J. P. A. Kalis), Rothschild bequest BM 1939-1, BM Geometrid slide no. 19486. Paratypes. 1 ♀, same data as holotype; 1 ♀, Tjamba, near Maros, 1,500 ft, ii. 1938, J. P. A Kalis, S. W. Celebes, BM 1938-310, BMNH.

Range. Sulawesi.

Etymology. The species is named after my wife, Jan, in gratitude for her patience with the moths.

*Bozara subrobusta* (Inoue, 1988), comb. nov.


Diagnosis. Easily distinguished from other members of the group by postmedial consisting of two narrowly separated white lines instead of a dark line bordered distally with white. Male genitalia (illustrated in Inoue op. cit.): very similar to other members of the group, but valves longer and somewhat narrower, uncus shorter and blunter, and octavals long and slender, converging strongly and separating again towards the tips.

Range. Taiwan, Hong Kong.

*Gymnoscelis subpumilata* Inoue and its allies

*Gymnoscelis subpumilata* was described by Inoue (1972) from the mainland of Japan and the Ryukyus, and has subsequently been discovered in Hong Kong, together with a closely related undescribed species. Both species correspond closely with the definition of *Spiralisigna* Holloway both in details of facies and male genitalia. The general structure of the male genitalia is almost identical with that of the type species, *minutissima* Swinhoe, including the characteristic shape of the scent pencils on the saccus. The aedeagus is similarly massive. In the female the ductus bursae is short and broad, unlike in *minutissima*: the spined sclerotised plate of the bursa copulatrix is present in *subpumilata*, though with little spiralling, but somewhat reduced in the new species. I therefore propose the transfer of *subpumilata* Inoue to *Spiralisigna* comb. nov., and describe the new species as:

*Spiralisigna gloriae* sp. nov.

Male (Fig. 4). Forewing 9 mm; forewing and hindwing pattern virtually identical to *subpumilata*, but markings brown on a ground colour of buff-yellow rather than grey on a more creamy background.

Female. Similar to the male.

Male genitalia (Fig. 16). Very similar to *subpumilata*, but valves broader with ventral edge more sinuous, narrowing more abruptly towards the tip. Uncus shorter, more overlapped by expanded tegumen.

Female genitalia (Fig. 17). Ductus bursae broad and short, as in *subpumilata*. Bursa long and strongly ribbed, but lacking the prominent lateral lobes of *subpumilata*. 
Figs 16–17. Male and female genitalia of *Spiralisigna gloriae* sp. nov. (16: ♂, 17: ♀).


Range. Hong Kong.

Etymology. The species is named in honour of Gloria Barretto, in recognition of the work done by her on wildlife in Hong Kong.

The status of *Chloroclystis subcostalis*

The taxon *subcostalis* was described by Hampson in 1893 from Sri Lanka. Though subsequently placed in *Chloroclystis*, it was described in *Axinoptera*, and is the type species of that genus, revived by Holloway (1997). The name *subcostalis* was subsequently applied by Inoue et al. (1982) to insects from the mainland of Japan and the Ryukyus. Examination of the series of *subcostalis* in the BMNH has shown that *subcostalis* proper is confined to Sri Lanka, and those specimens in the series from the Khasis and elsewhere in Northern India belong to a related, but distinct species. The latter is identical to specimens from Hong Kong and Yunnan province, China. Specimens from the mainland of Japan and the Ryukyus in Professor Inoue's collection, now in the BMNH, are all females, but again have genitalia identical to those from Hong Kong and Northern India. The male appears to be unknown from the mainland of Japan or the Ryukyus (Yazaki, pers. comm.). I conclude that there is a single species distributed from N. India to South China, the Ryukyus, and the mainland of Japan, and name it as:

*Axinoptera anticostalis* sp. nov.

Male (Fig. 5). Forewing 7 mm; very similar to *A. orphnobathra* Prout, but lacking dark basal suffusion on forewing; ground colour grey; postmedial a single black line, sharply angled at vein M₂; costa bowed basally, reddish, with raised scales running the full length, bordered by a subcostal groove lined with pale yellow scales, itself bordered by a further row of black raised scales, the whole giving the impression of a reddish stripe parallel to the costa; hindwing with prominent postmedial and white marginal dot.
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Figs 20–21. Female genitalia of Axinoptera spp. 20. A. antisticalis sp. nov. 21. A. subcostalis Hampson.
Fig. 22. Male genitalia and the 8th sternite and tergite of Eupithecia sekkongensis sp. nov.

Female (Fig. 6). Forewing 7 mm; identical to subcostalis.

Male genitalia (Fig. 18). Similar in structure to subcostalis (Fig. 19), but dorsal arm of valve narrower and more tapering; ventral arm of valve tapers much more strongly to longer, more ventrally curved terminal spike.

Female genitalia (Fig. 20). Similar to subcostalis (Fig. 21) in the lateral spines on the ventral margin of the ostium bursae and the spiral twist of the ductus, but lacking the two prominent lobes on the upper part of the bursa seen in subcostalis.

Holotype. ♂, Ding Fu Shan, Guangdong Province, S. China, leg. Mr. Kent Li ex larva found on Glochidion eriocarpum (Euphorbiaceae), emerged 27. iv. 1993, BMNH, BM
Geometrid slide no. 19635. Paratypes. 1 ♀, Ng Tung Chai, New Territories, Hong Kong, 26. iv. 1981, Oxford University expedition, BMNH, BM Geometrid slide no. 17987; 1 ♂, Tengchong, Yunnan Province, S. China, 1,930 m., 28-30. v. 1992, leg. Xue Dayong, ZCAS.


Range. Hong Kong, S. China, Taiwan, Ryukyus, the mainland of Japan, North-east India, Bhutan.

Remarks. This is likely to be the same species whose larva was described from Dehra Dun, North India, by Singh (1953), also reared on Glochidion.

The genus Eupithecia in Hong Kong

The genus Eupithecia is highly speciose in the Palaearctic area, and in montane regions of Southern China, but generally much less diverse in the lowland tropics. All species occurring in Borneo, for instance, are montane (Holloway, 1997). So far only the following four species have been found in Hong Kong: costalis Walker, rigida Swinhoe, toshimai Inoue, and two males of a distinct species which appears to be undescribed. I now name it as:

Eupithecia sekkongensis sp. nov.

Male (Fig. 7). Forewing 9 mm; frons and vertex blackish brown; thorax and abdomen white; forewing ground colour clear white with weakly defined fasciation delicate light brown. Costa with a dark brown streak basad, and two small dark brown semicircular patches at one half and two thirds; basal area suffused with dark scales, less so towards the hind margin; antemedial and discal area strikingly white, with a prominent black discal streak and one or two irregular dark bands towards the hind margin; outer part of wing pale brown, slightly reddish in the median area, darkening considerably submarginally; an ill-defined pale wavy submarginal; marginal line dark brown. Hindwing white, with a clearly defined dark discal streak, some irregular brown fasciation near the hind margin, and very weak postmedian and submarginal bands of brown blotches.

Female. Unknown.

Male genitalia (Fig. 22). Valves very deep and rounded; vinculum shaped like an hourglass; eighth sternite narrow and elongated, with two very distinct lobes basally.

Range. Hong Kong.

Remarks. The facies and combination of genitalic features appear to be quite distinct from any other species so far described from the region, including the very large number of species described by Vojnits. The affinities of this species are not very clear. In facies it is similar to members of the Eupithecia bohatschi group defined by Vojnits (1976) and Inoue (1988). However the shape of the eighth sternite is very unlike those of members of the group, all of which are strongly bifid. The genitalia of the new species are closer to those of species like koreica Vojnits, though the facies is very different.

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References


摘要

香港および東南アジアのカバナミシクス族の新種と分類学的知見 (A. C. Galsworthy)

最近 Holloway (1997) によってボルネオのカバナミシクス族が検討され、大属 Chloroclystis がいくつかの属に分離された。しかしながら、ボルネオ以外のアジア地域の本族についてはまだ十分な検討がなされていない。本報では香港を中心とした東南アジア地域の本族についての知見を報告した。

Sigilliclystis gen. n.

模式種: Chloroclystis insigillata Walker (オーストラリア, ノーフォーク島)
ほかに enctica (Prout) (フィジー), lunifera (Holloway) (ニューカレドニア) と、次の新種が含まれる。

Sigillicystis kendricki sp. n. (香港)

Prout (1958) によって Chlorocystis infusata Walker (Holloway (1997) によって Axinoptera 属に移された) の亜種として記載された次の3種と、台湾の C. subrobusta (Inoue) を Bosara 属に移し、あわせてスラウェシ産の1新種を記載した。

Bosara errabunda (Prout) (台湾、香港、海南島)
Bosara albitornatis (Prout) (スリランカ、南インド)
Bosara exortiva (Prout) (ニューギニア)
Bosara subrobusta (Inoue) (台湾、香港)
Bosara janae sp. n. (スラウェシ)

日本から記載された Gymnoscelis subpumilata Inoue, ホソバチピナミショクを Spiralsigna 属に移し、香港産の近縁の1新種を記載した。

Spiralsigna subpumilata (Inoue) (琉球)
Spiralsigna gloriae sp. n. (香港)

インド北部から台湾、日本にまで分布していると考えられていた Axinoptera subcostalis Hampson は、スリランカに固有の種で、他地域のものは次の新種に属する。

Axinoptera anticostalis sp. n. アトシロモンカバナミショク (インド北部、ブータン、香港、中国南部、台湾、日本)

香港の Eupithecia 属は従来3種しか知られていなかったが、次の1新種を記載した。

Eupithecia sekkongensis sp. n. (香港)

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