Moths of the tribe Pseudoterpnini (Geometridae: Geometrinae): a review of the genera

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The classification of the genera of the widely distributed Old World tribe Pseudoterpnini is reviewed and 34 genera are recognized. Two new generic synonyms (Sterictopsis Warren and Oxyphanes Turner as synonyms of Rhuma Walker), and 21 new or reinstated combinations are established. Representative moths of all the genera are illustrated in colour (upper side and underside), and genitalia of all genera are illustrated in monochrome (162 figures). All the known species and subspecies of Pseudoterpnini are listed (321), together with their synonyms. The Pseudoterpnini and their characters are assessed, and many genera are newly assigned to the tribe. © 2007 Natural History Museum, London. Journal compilation © 2007 The Linnean Society of London, Zoological Journal of the Linnean Society, 2007, 150, 343–412.

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INTRODUCTION

Moths of the family Geometridae occur almost worldwide, although they are most diverse in the tropics, and they are one of the three most species-rich families of Lepidoptera, with about 21 000 described species. The caterpillars, known as loopers or inchworms from their looping gait resulting from a reduced number of abdominal prolegs, feed mainly on the leaves of a wide range of plants, particularly trees and shrubs. Although it seems likely to be significant, the extent of their environmental impact is not yet known because the life histories of the majority of these moths have not been investigated. Geometridae are generally secretive and cryptic insects, the moths sometimes green as the leaves they rest on, or brown, grey and other colours forming mottled bark-like patterns of flecks and wavy lines. Their resting postures enhance camouflage, with the moths spreading their wings flat against the underside of leaves, and the caterpillars often twig-like.

The family Geometridae has long been the focus of interest of dedicated researchers from leading institutions around the world, and they have made much progress towards a better understanding of geometrid taxonomy and systematics. The subfamily Geometrinae, with more than 2400 species in nearly 270 genera, has received major attention in recent decades in studies by Ferguson (1985, covering the North American representatives), Holloway (1996, Bornean), Pitkin (1996, Neotropical), McQuillan & Edwards (1996, Australian), Hausmann (2001, European) and Han (2005 (unpublished), Chinese representatives). Further work is in progress by Peter McQuillan and Cathy Young on a generic-level review of the Australian Geometrinae, based on adult and immature morphology and gene sequences.

Although regional, these works have included discussion of broader taxonomic context, but such is the global diversity of the Geometridae that investigations that shed light on some aspects often also highlight the need for further study. So, while global synthesis of the subfamily Geometrinae is a goal in sight for taxonomists, more building blocks towards that end are still required. This study, a review of all the genera of the Pseudoterpnini, aims to provide one such contribution.
Moths of the tribe Pseudoterpnini (alternatively treated as subtribe Pseudoterpnini by Holloway, 1996) are widely distributed in the Old World, from western Europe to the western Pacific, in temperate, subtropical and tropical regions. The group is a conspicuous component of the Geometrinae, in comprising 34 genera and more than 300 species, and in the atypical appearance of the moths. With a wing-span ranging up to 74 mm, they are generally larger and also more robust than other more typical slender-bodied Geometrinae, and instead of the typical green geometrine colouring, their wings are of mixed shades of brown, grey, white and yellow, with strongly patterned undersides. These and other anomalous features discussed under ‘Taxonomic characters of the Pseudoterpnini’ make the Pseudoterpnini a fascinating group for study, and highly significant to the understanding of Geometrinae and Geometridae.

Our study sets out to provide an improved taxonomic framework at the genus level for the Pseudoterpnini. It will enable better assessment and understanding of the many species encompassed within the genera reviewed, and the wealth of data that all these taxonomic names represent. The study is designed to give a global overview of the group, bringing together the knowledge gained from regional studies (both published and in progress) and adding to it. In particular, our review builds on and complements research by Han & Xue (in prep.) on the Chinese Geometrinae, which those authors are preparing for a forthcoming volume of the Fauna Sinica series. The Pseudoterpnini are well represented in China, with 15 genera occurring there.

COMMENTS ON THE TAXONOMIC HISTORY OF THE PSEUDOTERPNI

Pseudoterpnini Warren, 1893 (as Pseudoterpninae). Holloway, 1996 (as Pseudoterpnini); Hausmann, 1996a, 2001 (as Pseudoterpnini). See also comment on availability of the name Pseudoterpnini by Hausmann, 1996b: 96.

Terpnini Inoue, 1961, based on Terpna Herrich-Schäffer [1854], a misspelling of Terpne Hübner, 1822 (which is a junior synonym of Geometra Linnaeus), but referring to Terpne auctorum (= Pachyodes Guenée). [Synonymized by Holloway 1996: 192; Hausmann, 1996b: 96.]


The Pseudoterpnini were first named as subfamily Pseudoterpninae by Warren (1893) in a study of Indian Geometridae, and included the genera Actenochroma, Dindica, Terpna (see above) and Sphagnodela Warren (which is not included in Pseudoterpnini in the present study). The next major work was by Prout (1912a), who preferred to use informal groupings, but brought together most of the genera now known as Pseudoterpnini in his groups 1 and 2. These comprised: Actenochroma, Aeolochroma, Herochroma, Crypsiphonata, Cyneoterpa, Dindica, Epipristis, Heliomystis, Hypodoxa, Metallolophia, Mimandria, Orthostrasa (a homonym later replaced by Orthostris), Pingasa, Protophyta, Pseudoterpa, Rhuma, Sterictopsis (treated in the present study as a synonym of Rhuma syn. nov.), and (under Terpna) Absa, Calleremites, Dindicodes, Hypobapta, Lophopelma, Pachista, Pachyodes and Psilotagmia. Prout also included Apodasmia Turner, Gnophosema Prout, Sphagnodela, Synclymus Butler and Xenochroma Warren, none of which is included by us in Pseudoterpnini in the present study.

A number of genera occurring in Australia were grouped together as ‘archaic types’ of Geometridae by Goldfinch (1929), mainly following groups 1 and 2 of Prout (1912a): Aeolochroma, Austroterpa, Crypsiphana, Cyneoterpa, Epipristis, Heliomystis, Hypobapta, Hypodoxa (treated under Pingasa), Paraterpa, Pingasa, Protophyta, Rhuma and Sterictopsis. He also included Oenochlora Warren, which we do not include in Pseudoterpnini in the present study.

Inoue’s (1961) treatment of Japanese Geometridae had a concept of Terpnini that was based on Terpna, and has subsequently been synonymized with Pseudoterpnini (see above); he included also Dindica and Pingasa (and Agathia Guenée – not included in Pseudoterpnini in the present study). Vildalepp (1981) included in Terpnini: Aplasta, Holoterpa, Pseudoterpa (in subgroup Pseudoterpnina) and Agathia (in subgroup Terpina).

Several of Goldfinch’s ‘archaic types’: Aeolochroma, Austroterpa, Crypsiphana, Cyneoterpa, Heliomystis, Hypobapta, Sterictopsis, and additionally Lophothorax and Oxyphanes (the last synonymized by us with Rhuma in the present study), were treated as ‘Section A – the grey and brown genera’ of Geometrinae by McFarland, 1988). We now formally assign them, and other genera in Australia cited above, Hypodoxa, Paraterpa and Protophyta, to Pseudoterpnini.
Heppner & Inoue's (1992) checklist of Taiwanese Geometridae termed the tribe Pingasini, without valid description, and included Archaeoabalbis (currently a junior synonym of Herochroma), Dindica, Pachyodes and Pingasa. Holloway (1996) covered the Bornean members and used subtribe status, Pseudoterpniti, citing the genera Actenochroma, Dindica, Epipristis, Herochroma, Lophothorax, Metallophia, Orthorisma, Pachyodes, Pingasa, Pullichroma and Sunda- doxa. His inclusion of Pingasa rendered Pingasini a synonym of Pseudoterpniti. Hausmann (1996a, b, 2001) covered the Middle Eastern and European members and reverted to use of tribal status, Pseudoterpnini, citing the genera Aplasta, Holoterpna, Pingasa and Pseudoterpna, with mention in the first of those works also of Agathia, and Doobadia Warren, which are not included in Pseudoterpnini in the present study.

Additional genera are newly included in Pseudoterpnini in the present study: Crypsiphona, Cynoeterpna, Hypobapta, Hypodoxa, Metaterpna, Mictoschema, Paraterpna, Aeolochroma, Austroterpna, Hetiomytis, Lophothorax, Protophyta and Rhuma.

MATERIAL AND METHODS

This study has been based, where possible, on the examination of primary types, and also on extensive material in various collections, particularly those of the Natural History Museum, London, UK (NHM), the Institute of Zoology, Chinese Academy of Sciences, Beijing, China, and the Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany. We examined external features of most species in each genus, and a considerable range of genitalia preparations, which are indicated, for example, by ‘[male genitalia]’, against the species name in the list under each genus. The terminology of the genitalia largely follows that of Klots (1956), and is much as has been used in Pitkin (1996: labelled in fig. 87; 2002: labelled in fig. 264). The illustrations of whole moths (upper side and underside), moth genitalia and abdomens were prepared from digital scans, and were subsequently edited in Adobe Photoshop. The whole moth scans were made by Phil Crabb of the NHM’s Commercial & Business Image Resource, using a Nikon DX1 body mounted on a Sinar plate camera, with a Hasselblad 135-mm lens, and the genitalia and abdominal scans were made by Shayleen James using a Nikon Super Coolscan 4000 ED camera.

TAXONOMIC CHARACTERS OF THE PSEUDOTERPNINI

The Pseudoterpnini are atypical of Geometrinae in several respects, and some features give many of the moths a superficial resemblance to ennomines, partic-

ularly to those of the tribe Boarmiini as noted by Holloway (1996: 192). The majority of pseudoterpnine moths are larger and more robust than the ‘typical’ concept of Geometrinae as delicately built moths, and Pseudoterpnini never have the bright pure green colour that is obvious in many other Geometrinae (e.g. Geometrini and Nemorini). Only a few Pseudoterpnini have a noticeable green hue, and that is usually dull or mottled. Unlike most Geometridae, the undersides of the wings are boldly patterned in most Pseudoterpnini and the discal spots are elongated or large. The hind wing shape is often characteristic of the tribe, with the costa short and the anal margin elongate. Below is a more detailed account of the characters, with those that we consider most significant numbered.

Adult moths

1. Fairly large with build robust, and with dense scale covering on the wings. This combination applies to most genera, and the largest, Limbatochlamys, has a wingspan extending up to 74 mm, but a few pseudoterpnine moths are small: notably Aplasta, with a wingspan of 20–29 mm or less (Hausmann, 2001: 115) – see discussions below and under that genus.

2. Wing pattern (upper side) not bright or pure green, instead often of mottled markings with an overall brown, grey, or olive-green hue, or sometimes with bold yellow or white patterns [e.g. Dindica (Fig. 8A) and many species of Dindicodes (Figs 10A, 11A)]. Actenochroma (Fig. 2A) has the greenest appearance in the Pseudoterpnini, but pale rather than bright green. N.B. Although the Pseudoterpnini do not usually appear obviously green, the one representative tested by Cook et al. (1994), Pingasa venusta, had the pigment geoverdin present in large quantities, which is the character regarded as definitive of the Geometrinae.

3. Wing pattern (underside) usually with strong markings, dark discal spots and bands, e.g. Actenochroma (Fig. 2B) and Dindica (Fig. 8B); often with large basal zone (from base of wing to postmedial line) differing in colour or tone from outer zone (from postmedial line outwards). Exceptions: a few genera: Aplasta, Holoterpna, Mictoschema, Minandra and Pseudoterpna, have only faint underside markings. Most Geometridae other than Pseudoterpnini have underside markings fainter and paler than on the upper side.

4. Discal spot often elongated, forming a dash or comma, or large and round, and usually more pronounced on underside of wings, e.g. Ahsala (Fig. 1B), Dindicodes (Figs 9B, 10B) and Hypobapta (Fig. 16B). Discal spots are small and dot-like in most geometrines outside the Pseudoterpnini, but
they are occasionally elongated, e.g. in *Iotaphora* Warren (tribal placement unknown).

5. Frenulum usually normal, i.e. moderately well developed, and not reduced as in many other Geometrinae as noted by Holloway (1996; as Geometrini). Degree of development of the frenulum can be a variable character (as noted in Pitkin, 1996: 312), but the presence in the Pseudoterpnini of a normal, fairly strong, frenulum might be to some extent associated with robust build, as in a few less robust members of the group the frenulum is reduced or absent (absent in *Aplasta* and *Holoterpa*, reduced slightly to moderately in *Pseudoterpa*). The frenulum is absent also in *Mictoschema*, males of which are small but females larger and more robust. Outside the Pseudoterpnini, an example of fairly large and robust moths with a well-developed frenulum is the Neotropical nemoriine genus *Rhodochlora* Warren (Pitkin, 1996: 318). Expansion of the humeral lobe of the hind wing (associated with the frenular reduction of Geometrinae by Holloway, 1996) is moderate to strong in the Pseudoterpnini, e.g. strong in *Pullichroma*, *Pingasa* and *Mictoschema*.

6. Hind wing with costa short and anal margin elongate, at least slightly so in the majority of genera and strong in some [e.g. *Metallophilia*, particularly *vitticosta* (Fig. 20), and *Mictoschema* (Fig. 22)], but not in *Aplasta* and *Pseudoterpa*, or in the group of genera placed with *Aelochroma* in the current work (see genus *Aelochroma* onwards), except sometimes *Aelochroma* itself. Other features of pseudoterpnine wing shape: outer margin of fore wing convexly curved and hind wing rounded, hind wing usually with the apex rounded also; fore wing apex never strongly falcate as in some other Geometrinae (e.g. *Tanaorhinus* Butler), and slightly falcate only in *Limbatochlamys*, never strongly angled or with a tail, at the most only weakly angled (in *Austroterpa*).

7. Thorax and abdomen often with dorsal crests (e.g. well developed in *Dindica*, *Pachyodes* and *Aelochroma*), but not in various genera including, for example, *Acenochroma*, *Aplasta*, *Holoterpa* and *Protophyta*. Inoue (1961) cited developed crests as a character of Terpnini (which was his concept of Pseudoterpnini); he noted crests as absent in most other geometrine tribes, present but not strong in Hemitheini, and weak in Hemistolini [included in Hemitheini (as Hemitheiti) by Holloway (1996)]. However, his study was restricted to Old-World fauna, and Pitkin (1996: 322) noted that prominent crests are present in some members of the Neotropical tribe Lophochoristini [which was tentatively included in Rhomboristini (as Rhomboristiti) by Holloway (1996)].

8. Pair of fields of needle-like scales on sternite 3 of the male abdomen more often absent than present (absent in 17 genera, present in eight genera, present or absent in nine other genera, see genera descriptions for details). Pseudoterpnini are unusual in the low incidence of this character that generally typifies the Geometrinae. However, Pitkin (1996) noted the absence of these paired fields in about one-third of Neotropical genera.

Other characters of adult moths: Antenna of male usually with basal half or more bipectinate (or sometimes simple filiform or occasionally fasciculate); in female commonly simple filiform, or occasionally serrate or lamellate, but bipectinate with short rami in *Lophophilma neonoma*, *Lophothorax*, *Mimandria*, *Pachista*, *Psilotagma pictaria*, and sometimes in *Holoterpa* and *Limbatochlamys*. Rami of antenna usually devoid of scales, but presence of scales observed in the following genera: *Mimandria*, *Holoterpa errata* (but not in other *Holoterpa* species), *Hypodoxa multicolor* and *H. regina* (but not in *H. emiliae*), *Hypobapta* (basal few rami only), *Aelochroma chioneschatia* (but not in other species), *Rhuma divergens* (basal few rami only, and not in other *Rhuma* species). These observations support the findings by Young (2006) that scaled rami occur in a fairly wide range of geometrine genera. Moths of Pseudoterpnini never have a white interantennal fillet as is sometimes present in various other Geometrinae (e.g. usual in Neotropical Geometrinae (Pitkin, 1996: 313)). Frons often protruding slightly to strongly (e.g. strong in *Absala*); some genera with black band or large black area on frons, others without. Labial palpus with first and second segments rough-scaled, third segment often short in male.

**Wing pattern:** additional features — wing pattern occasionally sexually dimorphic (e.g. in *Aelochroma*) but usually similar in both sexes. Antemedial and postmedial lines on wings dark, usually brown or black but sometimes grey-green; antemedial line usually present only on fore wing (but present also on hind wing of *Epipristis truncataria*); subbasal line, where present, only on fore wing; postmedial line of fore wing usually angled outward in upper half or sometimes curved, rarely almost straight. Terminal line usually strong and blackish, sometimes broken into dashes. Tufts of raised scales present on hind wing of a few genera (*Hypodoxa*, *Pingasa* and *Sundadox*), and occasionally on fore wing (*Heronochroma* and *Hypodoxa*). Veneration: fore wing with *R₂* stalked, with *M₁* commonly close and or even conenate, but only occasionally on a short stalk with *R₂* (sometimes in *Holoterpa* and *Rhuma*, occasionally in *Pseudoterpa*, and rarely an extremely short stalk in *Aelochroma*) — this character is subject to variation within genera and
Figures 1–7. Pseudoterpnini moths. A, upper side, B, underside. Scale bars = 10 mm. 1, Absala dorcada; 2, Actenochroma muscicoloraria; 3, Aplasta ononaria; 4, Calleremites subornata; 5, Crypsiphona melanosema; 6, Crypsiphona occultaria; 7, Cyneoterpna wilsoni.

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even within species; veins M₁ and CuA₁ not stalked. Hind wing veins M₂ and CuA₁ separate or connate. R₁ + M₁ of the hind-wing usually separate or connate, as in many Geometrinae, not stalked as usual in Holloway’s (1996) broad concept of Hemitheini (given by him as Hemitheati) and in Nearctic Geometrinae in general (Ferguson, 1985); R₁ + M₁ are stalked in a minority of pseudoterpnines: Aplasta, Calleremites, Dindica glaucescens, Metallolophia variegata, Austroterpna, often in Holoterpna and Rhuma, and rarely with a very short stalk in Pingasa (lahayei). A₃ of hind wing usually present in Pseudoterpnini but sometimes reduced, absent in Aplasta.

Hind tibia in male commonly somewhat dilated when a hair pencil is present and very strongly dilated in some species of Herochroma. Hind tibia usually with two pairs of spurs, but with only one in Cryptiphona and Holoterpna, and sometimes only one also in Hypobapta and Mictoschema. Male hind tibia commonly without a terminal extension, but present in: Dindicodes (occasionally), Herochroma, Hypodoxa, Pingasa (usually, a short extension), Psilotagma, Aeolochroma (occasionally) and Rhuma. Ferguson (1985) regarded the presence of this extension as common in Geometrinae and absent from other subfamilies. In the abdomen, the shape of the ansa of the tymbal organ shows more variation than that given by Cook & Scoble (1992) as a probable synapomorphy of the Geometrinae (other than the Dysphanini): usually narrow just above base, broader medially and narrowing to apex. This state occurs in the majority of Pseudoterpnini, but exceptions (principally Calleremites, Dindica, Hypobapta, Paraterpna and Psilotagma) have the apex of the ansa broadened as in some Ennomiine or some other geometrine subfamilies. Outside of Pseudoterpnini, Geometrinae known to have the apex of the ansa broadened include a few Neotropical examples in the Nemoriini: Tachyphyline pretiosa (Thierry-Mieg), Phrudocentra janeira (Schaus) and Phrudocentra kinstonensis (Butler) (Pitkin, 1996). In some Pseudoterpnini, notably certain Australian genera: Heliomystis, Hypobapta, Protophyta and Rhuma, the ansa is broad at the base and often tapering. This was remarked on by Young (2006), who noted similarity to the state given for the Oenocriminae s.l. by Cook & Scoble (1992).

Abdominal segment 8 commonly unmodified, but sternite 8 modified in males of some genera: Absala, Calleremites, Cryptiphona, Cyneuterpna, Herochroma (flavibasalis-group) and Orthorisma (sternite and tergite), and tergite 8 modified in Paraterpna.

It is worth noting an additional information resource that illustrates moths of many Australian species, specimens in the Australian National Insect Collection (ANIC), CSIRO Entomology, Canberra: http://www.ento.csiro.au/gallery/moths/Geometridae.

**Male genitalia**

1. Socii and uncus modified in the majority of genera. Typically, the socii of Pseudoterpnini are strongly developed, large, and sclerotized, and the uncus is reduced to merely the basal component, or sometimes with a vestigial or short process. The socii and uncus base commonly form a single sclerotized structure, which is fused basally, bifid and fork-like distally and is referred to here as the socii/uncus complex (e.g. Figs 51, 53, 56–64). The derivation of the structures and demarcation between them is not entirely clear, as discussed by Holloway (1996: 192), but from our current study we consider the bifid distal part of the structure more likely to be equivalent to socii than to be a bifid uncus. In extreme cases (Cryptiphona and Pullichroma, Figs 55, 79), the socii appear to have replaced the uncus entirely. Towards the other end of the range, the uncus and socii are by degrees less modified: although still flanked by enlarged sclerotized socii, the uncus is moderately to well developed in Herochroma elaearia and Metaterpna thyatiria, and long and rod-like in Actenochroma and Limbatochlamys. Psilotagma and Calleremites have a rod-like uncus, but with weaker socii, especially in the latter genus. Orthorisma is modified differently from other members of the Pseudoterpnini in having strong enlargement of the uncus, with relatively small socii. Tendencies within the Geometrinae towards dominance of socii over uncus have been discussed by Holloway (1996), who noted this in Geometrini, Aracimini, Comibaenini and a few others, and by Pitkin (1996: 318), who noted several independently derived occurrences in Neotropical representatives: Synclorini, some Lophocoristini and a nemorine: Rhodochlora rufaria Prout.

The group of genera placed with Aeolochroma in the current work (see genus Aeolochroma onwards) differs strongly from other Pseudoterpnini in that the socii are vestigial or absent (in Aeolochroma, Austroterpna, Lophothorax, Protophyta and Rhuma), and only weakly developed in Heliomystis; these genera all have a rod-like uncus (Figs 81–89). Such weak development of socii is unusual in the Geometrinae, but has been noted for several varied Neotropical genera by Pitkin (1996: 318), and was considered to be one of the characters of the tribe Dysphanini by Holloway (1996: 185).

2. Valva often divided into two parts: costal lobe and sacculus [e.g. Aeolochroma (Fig. 82), Dindica and Dindicodes (Figs 57, 58), and Pachyodes (Fig. 73)]. The valva is often complex and highly variable; both divided and undivided states occur in some genera (e.g. Herochroma and Lophophilena), but the valva of several others is always undivided (e.g.
Figures 36–42. Pseudoterpnini moths. A, upper side, B, underside. Scale bars = 10 mm. 36, Austroterpna idiographa; 37, Heliomystis electrica; 38, Lophothorax eremnops; 39, Protophyta castanea; 40, Rhuma subaurata; 41, Rhuma argyraspis; 42, Rhuma thiobapta.
Figures 43–50. Male abdomen, segment A8. 43, Absala dorcada; 44, Calleremites subornata; 45, Cryssiphona melanosema; 46, Cyneoterpna wilsoni; 47, Herochroma mansfieldi; 48, Orthorisma netunaria; 49, Paraterpna harrisoni; 50, Aeolochroma acanthina.
Figures 51–58. Male genitalia. 51, Absala dorcada; 52, Actenochroma muscicoloraria; 53, Aplasta ononaria; 54, Calleremites subornata; 55, Crypsiphona melanoosema; 56, Cyneoterpna wilsoni; 57, Dindica polyphaenaria; 58, Dindicodes crocina.
Figures 67–74. Male genitalia. 67, Metallophilia arenaria; 68, Metaterpna thyatiraria; 69, Mictoschema swierstrai; 70, Mimandria cataractae; 71, Orthorisma netunaria; 72, Pachista superans; 73, Pachyodes amplificata; 74, Paraterpna harrisoni.
Figures 75–81. Male genitalia. 75, Pingasa ruginaria communicans; 76, Pingasa ruginaria pacifica; 77, Pseudoterpna pruinata; 78, Psilotagma decorata; 79, Pullichroma pullicosta; 80, Sundadoxa multidentata; 81, Aeolochroma turneri.
Aplasta, Epipristis, Metaterpna, Pseudoterpna and Rhuma). A divided valva is uncommon in the Geometrinae, and it is more often seen in the Ennonminae (e.g. Macariniini, Abraxini and Eutoeini). In the Pseudoterpnini, the lobes of the divided valva are often over-lap or lie close together (e.g. Dindica and Dindicodes), and less commonly diverge (e.g. Absala, Fig. 51, and Mimandria cata-ractae) as they usually do in the Ennomine tribes just mentioned.

Other characters of male genitalia: Socii/uncus complex, or uncus where present, finely setose dorsally; socii usually tapered, but shaped otherwise in minor-plex, or uncus where present, finely setose dorsally; Other characters of male genitalia:

brane of the diaphragma (unusual character of the gnathos fused with the mem-
in Hypobapta (Fig. 63). Gnathos usually with a well-sclerotized median process or expanded region (in other Geometrinae the gnathos is sometimes similarly developed, sometimes weak). The gnathos of Hypobapta is less strongly developed, and it is absent in Cyneoterpna. A few Pseudoterpnini have the highly unusual character of the gnathos fused with the mem-
brane of the diaphragma (Crypsiphonina, Paraterpna and the flavibasalis-group of Herochroma). Coremata are present, situated basally to the valva, in about half of all pseudoterpnine genera. A cruciform vinculum in the region of the saccus, characteristic of Geometrinae (Holloway, 1996), is fairly infrequently distinct in Pseudoterpni (e.g. in Dindica and Dindicodes, Figs 57, 58). Aedeagus: commonly tubular and not with sclerotization reduced to a ventral longitudinal strip as in most other Geometrinae, although sometimes extended posteriorly on one side with a process. Vesica of aedeagus with cornuti present in slightly less than one-third of genera, which is considerably more frequent than in other Geometrinae.

Female genitalia

Ovipositor valves oblique (and usually truncate), papillate and usually sclerotized. This is the normal state for Geometrinae (Pitkin, 1996: 319; Holloway, 1996; except Geometrini (given by him as Geometriti) et al.) and is present in Pseudoterpni except in some species of Rhuma, and sometimes particularly strongly papillate, e.g. Crypsiphonina, Cyneoterpna and Metaterpna. Sternite 8 usually weakly sclerotized, but occasionally more so, e.g. in Dindicodes. Apophyses anteriores usually much shorter than apophyses posterioris (e.g. Figs 152, 153), and only occasionally approaching length of apophyses posterioris (e.g. Heliomystis; Fig. 157). Region around ostium often lightly sclerotized, broad and wrinkled, and some-
times forming a shallow anterior pouch. Corpus bur-
sae with or without a signum: signum absent in approximately two-thirds of genera, and a bicornute signum (a character cited by Holloway, 1996) present only in Actenochroma, Limbatochlamys and some-
times in Herochroma.

Diagnosis and monophyly

Although there is no single defining character of the Pseudoterpnini, the majority of genera share a suite of characters, which are numbered above. Several genera differ significantly, but still possess some charac-
ters by which they are associated with the Pseudoterpnini, and by which we consider them to be best placed within this group. These anomalous genera are Aplasta and several others, and the group of genera placed with Aeolochroma in the current work.

Moths of Aplasta, Holoterpna, Mictoschema, Mimandria and the type genus itself, Pseudoterpna, are fairly small with plain undersides, and have either the frenulum or the proboscis (or both) reduced, i.e. normal for Geometrinae other than Pseudoterpnini. They are known only from the Palaearctic (mainly Europe and the Middle East) and/or Afro tropical Regions, and do not occur where the majority of Pseudoterpnini are found, in Palaearctic China, the Oriental Region and Australasian Regions. In the male genitalia they have the modified socii/reduced uncus structure that is typical of Pseudoterpnini, and, although that character is not confined to Pseudoterpnini, Aplasta et al. do not have features of other Geometrinae that share it [e.g. bright green colouring, angled wings, and (Geometrini et al.) ovipositor valves that are not oblique and papillate]. Hausmann (2001: 113) regarded Aplasta in particular as possibly primitive Pseudoterpnini, and that might be the case with all five genera named above.

We have placed Aeolochroma in our current assess-
ment of the Pseudoterpnini because of the characters it shares with the tribe: typical robust build and wing pattern features, particularly the strongly marked underside; also the frenulum not reduced, and large crests present on the abdomen. However, the male genitalia are very different from those of most Pseudoterpnini in having a rod-like uncus and socii that are not enlarged but are modified in the opposite extreme: vestigial or absent. Several other genera with those genital characters are here associated with Aeolochroma and placed in Pseudoterpnini: Austroterpna, Lophothorax, Protophyta and Rhuma, and also Heliomystis (which has socii but only weakly developed). Their moths all have some degree of bold markings on the under side (Figs 34B–42B). All of these genera are restricted to the Australasian Region. Common (1990: 80) linked Aeolochroma and Heliomystis with other Australian genera here assigned to Pseudoterpnini: Crypsiphonina, Cyneoter-
of these genera and the rest of the tribe. Some characters of the Pseudoterpnini are present also, but generally exaggerated, in the Dysphanini (treated as a sister tribe to the rest of the Geometrinae by Holloway (1996)). These characters are: large and robust build, bold wing pattern, hind wing sometimes with costa short and anal margin elongate, and discal spots sometimes large. An additional character shared with Dysphanini, not by typical Pseudoterpnini but by Aeolochroma and associated genera, is that the socii are vestigial. Pseudoterpnini do not have a fovea, although a fovea is present in Dysphanini. Young (2006) considers that Dysphanini share some features with robust oenochromines.

Although it might seem easier to define the Pseudoterpnini if the tribe were limited to the most typical genera, i.e. those that share the suite of characters numbered above, we consider that the tribe is most likely to be monophyletic by inclusion of all the genera treated in our study. Even the core of more typical genera exhibits a wide range of variation, particularly in genitalic characters, as is discussed above (e.g. in degree of modification of the uncus and socii). However, the tribe is more consistent in characters of robust build and wing pattern, which are shared by the vast majority of the Pseudoterpnini, including the Aeolochroma complex. The type genus itself, Pseudoterpna, and several apparently related genera, are anomalous in comparison with the rest of the tribe, but we consider that their shared characters discussed above (genitalic characters, absence of bright green colouring, wing shape) indicates the likely monophyly of these genera and the rest of the tribe.

Biological notes


Early stages of Australian representatives of moths of Pseudoterpnini are well documented in McFarland (1988) and Herbison-Evans & Crossley (website, updated 2005). Information on other members of Pseudoterpnini is patchy, but Hausmann (2001) and Patocka (1994; pupa) cover aspects of European ones. The mature larva, where known, generally has a dorsal notch on the head as in most Geometridae, although this is very shallow in Aplasta (Hausmann, 2001: 114), and in some the head is so sharply pointed that a notch or groove is only apparent on close inspection, as in Crypsiphona (McFarland, 1988: figs 807–815). The larva is green (except in Holoterpna, and with brown markings in Rhuema), often sturdy, either plumply rounded, e.g. Dindica (Sugi, 1987: pl. 14, fig 3) or somewhat flattened dorsoventrally, e.g. Crypsiphona and Cyneoterpna (McFarland, 1988); without dorsal projections as are common in various other Geometridae. The typical resting posture is rigid and stick-like, angled away from the twig or leaf, and with the true legs often held tightly against the head, e.g. Crypsiphona (McFarland, 1988: figs 814, 815) and Pachista (Sugi, 1987: pl. 14, fig. 1).

Distribution and host plants

Moths of the tribe Pseudoterpnini are widely distributed in the Old World, from western Europe to the western Pacific, in four biogeographical regions: Oriental, Australasian, Palaeartic, and Afrotropical. The most widespread genus, Pingasa (and also the largest with 45 species), is distributed across all four regions, and Epipristis is in three regions: (Oriental, Palaeartic and Australasian), but the tribe in general is strongly represented in Asia, notably in China (15 genera), and in India and Indonesia (13 genera in each). Some genera (Absala, Calleremites, Dindicodes, Limbatochlamys, Meteterpna and Psilotagma) have a primarily mainland Asian distribution, others (Actenochroma, Dindica, Herochroma, Lophophelma, Metallicolophia and Pachyodes) extend more or less throughout the oriental tropics, and a few (Ortho­risma, Pullichroma and Sundodoxa) occur only in Sundaland. There are also strong Australian components, with a number of endemic genera richer in, or restricted to, the temperate part of Australia: Crypsi­phona, Cyneoterpna, Hypobapta and Paraterpna, in the main group of pseudoterpnine genera, and Aus­troterpna, Helio­mys­tis, Lopho­thorax, Protophyta and Rhu­ma, in the Aeolochroma complex. These are all small genera with between one and four species, but Aeolochroma itself (with 26 species) and Hypodoxa (a genus of 18 species in the main group of Pseudoter­p­ni­nae) are more widespread and are richer in tropical
Australasia (from northern Australia to the Pacific, with a centre of richness in Papua New Guinea).

Several of the above genera extend to the Palaeartic Region, if only just, but a few genera are exclusively Palaeartic (Aplasta, Pachista and Pseudoterpnia), or Palaeartic and Afrotropical (Holoterpnia). The remaining genera are two that are exclusively Afrotropical (Mictoschema and Mimandraria). Most Pseudoterpnini have host plants (as far as known) of trees and woody shrubs, and to a lesser extent herbs. A wide range of hosts is known across the tribe, and the most widespread and speciose genus, Pingasa, is recorded from 20 plant families. However, some correlation of distribution patterns and host plants is apparent within the tribe, in that the Australian genera mainly use Myrtaceae (nine of the ten genera have at least one host record, seven of these genera are solely on Myrtaceae, and one other, Aeolochroma, is on Myrtaceae and Euphorbiaceae). Two of the three exclusively Palaeartic genera (Aplasta and Pseudoterpnia) feed only on Leguminosae, although the third exclusively Palaeartic genus (Pachista) feeds on Magnoliaceae and Hippocastanaceae.

**REVIEW OF GENERA**

Genera and species are listed in alphabetical order in this study, except that in a few cases they are assigned to species groups, and the Aeolochroma complex of genera is treated separately (see genus Aeolochroma onwards). New and very recent taxonomic changes are indicated here, but otherwise synonyms of genera and species, and placements of species in genera, are as indicated in the catalogue of Geometrid Moths of the World (Scoble, 1999). The status of currently valid subspecies has not been assessed here and is left unchanged, but it is likely that many subspecies will prove to be synonymous with the nominate subspecies. Unavailable names are not generally cited here. In addition to nomenclatural references to genera and their type species, citations of significant subsequent studies of the genera are given where appropriate. The distribution records given for each genus are based primarily on specimens we examined in the course of this work, or on type localities, with the addition of a small number of literature records. In addition to The Times Comprehensive Atlas of the World (Tenth edition, 1999, reprinted 2001), we were able to trace some obscure place names on various websites of the internet using the search engine Google™. We have assigned the distribution data to biogeographical regions based on the folding map in Wallace (1876), as used also in http://www.nhm.ac.uk/research-curation/projects/bombus/regions.html, except that we have used Weber's Line as the boundary between Oriental and Australasian regions, as per Holloway & Jardine (1968). We have listed country names alphabetically within the regions.

**ABSALA SWINHOE, 1893**

(Figs 1, 43, 51, 90, 127)

Absala Swinhoe, 1893: 149. Type species: Absala dorcadia Swinhoe, 1893, by monotypy. Han, Li & Xue (2006). [Historical treatment of Absala as a subgenus of Terpnia, by Prout (1912a, 1927) indicates its inclusion, here confirmed, in Pseudoterpnini (of which Terpnini is a synonym).]

**Adults** (Figs 1, 43): Antenna bipectinate with short rami in male, simple filiform in female. Frons protruding strongly, rough-scaled. Labial palpus with third segment not elongate in female.

Wing pattern: whitish, diffused with olive-green striations. Fore wing with lines indistinct, with olive-green patch at wing base, apex, and mid dorsum; submarginal line white, distinctly wavy near costa and with red brown patch on inner side of line; discal spot small and olive-green. Hind wing with postmedial and submarginal lines white, bordered with olive; with red-brown patch between them at anal margin; discal spot black. Underside: wings white, bright yellow near base of wing; postmedial line marked merely by two large dark brown round spots, similar to discal spot; fore wing with dark brown patch at apex. Outer margin of wings slightly wavy; hind wing with costa of moderate length and anal margin slightly elongate.

Hind tibia of male without hair-pencil. Thorax and abdomen with dorsal crests sometimes well developed. Sternite 3 of abdomen without setal patches; sternite 8 of male lightly sclerotized, with posterior margin projecting as a low flat broad rim.

**Male genitalia** (Figs 51, 90): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basai one-third fused, prongs well separated and curved as S-shapes, pointing outwards at apex. Gnathos with very broad expanded median region, slightly bilobed and dentate at margin. Valva divided into two diverging parts, a large lightly sclerotized costal lobe, and smaller triangular sacculus (less than half length of costal lobe). Coremata absent. Transtilla with pair of arms not joined. Saccus distinctly developed, oval. Aedeagus slender, with a blunt sclerotized process towards posterior end; vesica without cornuti.

**Female genitalia** (Fig. 127): Apophyses anteriores shorter than apophyses posteriores. Very broad, wrinkled and sclerotized, region present around ostium, with pair of lateral lobes; lamella postvaginalis weakly defined and lightly wrinkled. Ductus bursae moderate in length, wrinkled, without antrum.
Figures 82–89. Male genitalia. 82, Aeolochroma hypochromaria; 83, Austroterpna idiographa; 84, Heliomystis electrica; 85, Lophothorax eremnopis; 86, Protophyta castanea; 87, Rhuma subaurata; 88, Rhuma argyraspis; 89, Rhuma thiobapta.
Figures 90–107. Male genitalia (aedeagus). 90, Absala dorcada; 91, Actenochroma muscicoloraria; 92, Aplasta ononaria; 93, Calleremites subornata; 94, Crypsiphona melanosema; 95, Cynoeteria wilsoni; 96, Dindica polyphaenaria; 97, Dindicodes crocina; 98, Epipristis oxycyma; 99, Herochroma ochreipicta; 100, Holoterpna diagrapharia; 101, Hypobapta percomptaria; 102, Hypodoxa emiliaria; 103, Limbatolamys rosthorni; 104, Lophophelma ruficosta; 105, Metallolophia arenaria; 106, Metaterpna thyatiraria; 107, Mictoschema swierstrai.
Figures 108–126. Male genitalia (aedeagus). 108, Mimandria cataractae; 109, Orthorisma netunaria; 110, Pachista superans; 111, Pachyodes amplificata; 112, Paraterpna harrisoni; 113, Pingasa javensis; 114, Pseudoterpna pruinata; 115, Psilotagma decorata; 116, Pullichroma pullicosta; 117, Sundadoxa multidentata; 118, Aeolochroma acanthina; 119, Aeolochroma turneri; 120, Austroterpna paratorna; 121, Helimonystis electrica; 122, Lophothorax eremnopsis; 123, Protrophyta castanea; 124, Rhuma subaurata; 125, Rhuma argyraspis; 126, Rhuma thiobapta.
Figures 127–133. Female genitalia. 127A, Absala dorada; 127B, signum of Absala dorada; 128A, Actenochroma muscicoloraria; 128B, signum of Actenochroma muscicoloraria; 129A, Aplasta ononaria; 129B, signum of Aplasta ononaria; 130, Crypsiphona occultaria; 131, Cyneoterpna wilsoni; 132, Dindica olivacea; 133, Dindicodes leopardinata.
Corpus bursae rounded, membranous; signum a small, rounded, lightly sclerotized patch with a tooth-like process.

**Diagnosis:** *Absala* is characterized by its wing pattern, particularly the underside, which is pure white with several very distinct large dark spots (three on the hind wing). *Dindicodes* sometimes also has three spots on the underside of the hind wing but the ground colour is yellow. The male genitalia of *Absala* are distinctive in having the prongs of the socii/uncus complex curved as S-shapes, in addition to being well separated. *Absala* is one of relatively few genera in the Pseudoterpnini that have sternite 8 of the male abdomen modified, its posterior margin projects uniquely as a low broad rim; *Absala* is also one of a minority of pseudoterpnine genera that have a signum in the female.

**Distribution:** Oriental Region: China; India; Thailand; Vietnam.

**Species included**

*dorada* Swinhoe, 1893 (*Absala*) [male and female genitalia]

**ACTENOCHROMA WARREN, 1893** *(Figs 2, 52, 91, 128)*


**Adults** (Fig. 2): Antenna simple filiform in both sexes. Frons protruding moderately. Labial palpus stout, moderate in length but with third segment fairly short.

Wing pattern: fairly uniformly palish green; with wavy antemedial and dentate postmedial lines darker green, each forming a dark green spot on costa of fore wing, postmedial line with whitish shading on outer side, postmedial line angled on fore wing; submarginal line faint whitish green; discal spot small and dark green. Underside: fore and hind wings with basal zone (to postmedial line) white or cream; outer zone with broad dark brown band; discal spot black-brown, fairly small and more of a dot than a dash. Outer margin of wings wavy; hind wing with costa short and anal margin elongate.

Hind tibia of male with hair-pencil. Thorax and abdomen without dorsal crests. Sternite 3 of male abdomen with a small weak median setal patch (pair of patches apparently merged).

**Male genitalia** (Figs 52, 91): Uncus well developed but very slender, long and rod-like. Socii sclerotized, well separated and strongly diverging, tapered to narrow apex, base broadened on inner side into a short lobe with strong ventral ridge at margin. Gnathos with median process small, V-shaped and curved. Valva long and narrow, with pointed apex, mainly lightly sclerotized; not divided into separate costal lobe and sacculus, but with spinulose harpe strongly developed as a long narrow finger-like process, reaching apex of valva. Coremata long but weak. Transtilla weakly developed. Vinculum projecting anteriorly beyond valva but not forming a distinct saccus. Aedeagus short and moderately broad, smooth; vesica without cornuti.

**Female genitalia** (Fig. 128): Apophyses anteriores shorter than apophyses posteriores, but longer than in most other genera of Pseudoterpnini. Very broad, wrinkled and slightly sclerotized, region present around ostium; lamella postvaginalis weakly defined and lightly wrinkled. Ductus bursae short, with lightly sclerotized antrum, short collar-like with small ventral section unsclerotized. Corpus bursae long and lightly wrinkled; signum very small, with a tiny blunt tooth at each end.

**Diagnosis:** The fairly uniformly palish green wing colour of *Actenochroma* is distinctive, more of a true green than normally seen in the Pseudoterpnini. The genus is also characterized by its male genitalia, with the long narrow valva bearing a long spinulose harpe. *Actenochroma* is one of only a few pseudoterpnine genera to have enlarged sclerotized socii together with a long rod-like uncus (other genera are *Limbatochlamys* and *Psilotagma*, although the socii of the latter genus are less strongly developed). *Actenochroma* is one of only three pseudoterpnine genera that have a bicor-nute signum in the female, the others being *Limbatochlamys* and (some species) *Herochroma*.

**Distribution:** Oriental Region: Brunei; China; Indonesia (Kalimantan, Sumatra); Malaysia (West); Nepal.

**Species included**

*muscicoloraria* (Walker, [1863] 1862) (*Hypochroma*) [male and female genitalia]

*sphagnata* (Felder & Rogenhofer, 1875) (*Hypochroma*)

**APLASTA HÜBNER [1823]** *(Figs 3, 53, 92, 129)*

Adults (Fig. 3): Moths small (compare scale of Fig. 3 with Figs 1–2, 4–41). Antenna simple filiform or shortly ciliate to weakly serrate in both sexes. Frons usually not protruding significantly but sometimes protruding slightly, fairly smooth scaled, mid brown to dark olive brown, often contrasting distinctly (but occasionally only weakly) with white to straw coloured band above frons. Proboscis strongly reduced. Labial palpus with third segment very short in male, moderately short in female.

Wing pattern: straw coloured, pale, mid or dark brown, sometimes with grey tinge but usually orange-tinged or reddish, [occasionally greenish grey (Hausmann, 2001: 115)] finely mottled with short striations; without antemedial line, other lines represented by bands or fasciae, stronger brown but often diffuse: medial fascia (sometimes present on fore wing but indistinct or absent on hind wing), postmedial, and marginal band; discal spots indistinct or absent. Underside similar to upper side although fasciae sometimes slightly stronger. Outer margin of fore wing smooth, hind wing almost smooth or very slightly wavy; hind wing with costa of moderate length, anal margin not particularly elongate. Frenulum and retinaculum absent. Hind wing with veins Rs and M1 on a stalk, A3 absent. Hind tibia of male without hair-pencil. Thorax and abdomen without dorsal crests; sternite 3 of abdomen without setal patches.

**Male genitalia** (Figs 53, 92). Sclerotized bifid soci/uncus complex present (see p. 351 for discussion), with basal two-thirds fused, prongs very close together, but occasionally diverging apically, tapered and usually curved dorsoventrally. Gnathos with median region broad and expanded, minutely spinulose. Valva not divided; valvae asymmetrical, left valva (in ventral view) simple and moderately slender, right valva with harpe present as a large spinose lobe. Coremata small. Transtilla weakly sclerotized, arched posteriorly. Saccus strongly developed, U-shaped or rounded. Aedeagus with a well-sclerotized posterior extension; vesica with densely wrinkled region appearing somewhat sclerotized, but without distinct cornuti.

**Female genitalia** (Fig. 129): Apophyses anteriores very short, much shorter than apophyses posteriores. Broad wrinkled region present laterally and anteriorly to ostium, ostial opening with slightly anterior lip, with tiny median notch; lamella postvaginalis not distinct. Ductus bursae not distinct from corpus bursae, other than antrum, which is extremely short, smoothly sclerotized and broadening towards ostium. Corpus bursae elongate and mainly membranous; signum large, elongate and longitudinally folded.

**Diagnosis:** Moths of Aplasta are unusually small for Pseudoterpini, and plainer than most others of the tribe, particularly on the underside. The genus has some similarities with other fairly small and atypical pseudoterpines with plain undersides, and in which the frenulum is also absent and the proboscis reduced or absent (Holoterpna and Mictoschema), or the frenulum is reduced but the proboscis is normal (Pseudoterpna), or the proboscis is reduced but the frenulum is not (Mimandria). Only Aplasta and Mimandria have wings that are sometimes orange–red tinged (commonly in Aplasta), and the wings of Aplasta are plain above, not patterned as in Mimandria. The male genitalia of Aplasta are characteristic in having a spinose harpe on the right valva but not on the left valva, whereas Pseudoterpna has a similar harpe on both valvae. In the female the elongate folded signum is characteristic.

**Biological notes:** Host plants: Leguminosae (Fabaceae): Ononis arvensis L., O. repens L. and O. spinosa L. (for this and other information on biology, including further reputed hostplants, see Hausmann, 2001: 114–117). The bright green larva is short, stout and setose (Hausmann, 2001: text-fig.160; Porter, 1997: 26, pl. 9: B). Hausmann describes the larva as being atypical of Geometrinae in having only a shallow dorsal notch on the head, and lacking projections on segment T1.

**Distribution:** Palaeartic Region: Armenia and Caucasus (Hausmann, 2001); Austria; Croatia; Cyprus; France (including Corsica); Germany; Great Britain (southern England); Greece (Hausmann, 1996a); Hungary? (Bihar, ‘Nagy Kagya’); Iran and Iraq (Hausmann, 2001); Israel (Hausmann, 1996a); Italy [including Sardinia, Sicily (Hausmann, 2001)]; Jordan (Hausmann, 1996b); Lebanon; Netherlands and Poland (Hausmann, 2001); Portugal; Romania; Spain (including Balearic Islands); Switzerland; Syria; Turkey; Yugoslavia.

**Species included**

- ononaria (Fuessly, 1783) (Phalaena Geometra) [male and female genitalia]
- rubellata (Villers, 1789) (Phalaena Geometra)
- sudataria (Hübner, [1817]) (Geometra)
- faecaturia (Hübner, [1819]) (Geometra) [synonymy cited by Hausmann, 2001]
- ononata Bellier, 1861 (Aplasta) [unjustified emendation, cited by Hausmann, 2001]
- ononaria spinosaria Dannehl, 1926 (Aplasta) [synonymy cited by Hausmann, 2001]

**CALLEREMITES WARREN, 1894A**

(FIGS 4, 44, 54, 93)

**Calleremites** Warren, 1894a: 384. Type species: Calleremites subornata Warren, 1894a, by original des-
**Adults** (Fig. 3): Moths small (compare scale of Fig. 3 with Figs 1–2, 4–41). Antenna simple filiform or shortly ciliate to weakly serrate in both sexes. Frons usually not protruding significantly but sometimes protruding slightly, fairly smooth scaled, mid brown to dark olive brown, often contrasting distinctly (but occasionally only weakly) with white to straw coloured band above frons. Proboscis strongly reduced. Labial palpus with third segment very short in male, moderately short in female.

Wing pattern: straw coloured, pale, mid or dark brown, sometimes with grey tinge but usually orange-tinged or reddish, [occasionally greenish grey (Hausmann, 2001: 115)] finely mottled with short striations; without antemedial line, other lines represented by bands or fasciae, stronger brown but often diffuse: medial fascia (sometimes present on fore wing but indistinct or absent on hind wing), postmedial, and marginal band; discal spots indistinct or absent. Underside similar to upper side although fasciae sometimes slightly stronger. Outer margin of fore wing smooth, hind wing almost smooth or very slightly wavy; hind wing with costa of moderate length, anal margin not particularly elongate. Frenulum and retinaculum absent. Hind wing with veins Rs and M1 on a stalk, A3 absent. Hind tibia of male without hair-pencil. Thorax and abdomen without dorsal crests; sternite 3 of abdomen without setal patches.

**Male genitalia** (Figs 53, 92). Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal two-thirds fused, prongs very close together, but occasionally diverging apically, tapered and usually curved dorsoventrally. Gnathos with median region broad and expanded, minutely spinulose. Valva not divided; valvae asymmetrical, left valva (in ventral view) simple and moderately slender, right valva with harpe present as a large spinose lobe. Coremata small. Transtilla weakly sclerotized, arched posteriorly. Saccus strongly developed, U-shaped or rounded. Aedeagus with a well-sclerotized posterior extension; vesica with densely wrinkled region appearing somewhat sclerotized, but without distinct cornuti.

**Female genitalia** (Fig. 129): Apophyses anteriores very short, much shorter than apophyses posteriores. Broad wrinkled region present laterally and anteriorly to ostium, ostial opening with slight anterior lip, with tiny median notch; lamella postvaginalis not distinct. Ductus bursae not distinct from corpus in females, other than antrum, which is extremely short, smoothly sclerotized and broadening towards ostium. Corpus bursae elongate and mainly membranous; signum large, elongate and longitudinally folded.

**Diagnosis:** Moths of *Aplasta* are unusually small for Pseudoterpini, and plainer than most others of the tribe, particularly on the underside. The genus has some similarities with other fairly small and atypical pseudoterpines with plain undersides, and in which the frenulum is also absent and the proboscis reduced or absent (*Holoterpna* and *Mictoschema*), or the frenulum is reduced but the proboscis is normal (*Pseudoterpna*), or the proboscis is reduced but the frenulum is not (*Mimandria*). Only *Aplasta* and *Mimandria* have wings that are sometimes orange–red tinged (commonly in *Aplasta*), and the wings of *Aplasta* are plain above, not patterned as in *Mimandria*. The male genitalia of *Aplasta* are characteristic in having a spinose harpe on the right valva but not on the left valva, whereas *Pseudoterpna* has a similar harpe on both valvae. In the female the elongate folded signum is characteristic.

**Biological notes:** Host plants: Leguminosae (Fabaceae): *Ononis arvensis* L., *O. repens* L. and *O. spinosa* L. (for this and other information on biology, including further reputed hostplants, see Hausmann, 2001: 114–117). The bright green larva is short, stout and setose (Hausmann, 2001: text-fig.160; Porter, 1997: 26, pl. 9: B). Hausmann describes the larva as being atypical of Geometrinae in having only a shallow dorsal notch on the head, and lacking projections on segment T1.

**Distribution:** Palaeartic Region: Armenia and Cauca-sus (Hausmann, 2001); Austria; Croatia; Cyprus; France (including Corsica); Germany; Great Britain (southern England); Greece (Hausmann, 1996a); Hungary? (Bihar, 'Nagy Kagya'); Iran and Iraq (Hausmann, 2001); Israel (Hausmann, 1996a); Italy [including Sardinia, Sicily (Hausmann, 2001)]; Jordan (Hausmann, 1996b); Lebanon; Netherlands and Poland (Hausmann, 2001); Portugal; Romania; Spain (including Balearic Islands); Switzerland; Syria; Turkey; Yugoslavia.

**Species included**

*odonaria* (Fuessly, 1783) (*Phalaena Geometra*) [male and female genitalia]

rubellata (Villers, 1789) (*Phalaena Geometra*)

sudataria (Hübner, [1817]) (*Geometra*)

faecaturia (Hübner, [1819]) (*Geometra*) [synonymy cited by Hausmann, 2001]

odonata Bellier, 1861 (*Aplasta*) [unjustified emendation, cited by Hausmann, 2001]

odonaria spinosaria Dannehl, 1926 (*Aplasta*) [synonymy cited by Hausmann, 2001]

**CALLEREMITES WARREN, 1894A**

(FIGS 4, 44, 54, 93)

*Calleremites* Warren, 1894a: 384. Type species: *Calleremites subornata* Warren, 1894a, by original des-
ignation. Han, Li & Xue (2006). [Historical treatment of Calleremites as a subgenus of Terpna, by Prout (1912a, 1927) indicates its inclusion, here confirmed, in Pseudoterpnini (of which Terpni is a synonym).]

**Adults** (Figs 4, 44): Only male known: antenna simple filiform. Frons protruding moderately. Labial palpus moderately long.

Wing pattern: Wing grey and olive-green, with fine striations particularly on hind wing. Brown antemedial line smooth, oblique and curved slightly outwards; brown postmedial line on fore wing, and similar line in middle of hind wing, smooth and curved inwards, demarcating dark olive area extending to antemedial line on fore wing and to base of hind wing. Underside: fore and hind wings with basal zone to postmedial line whitish, and yellow at base of wing; outer zone with a very broad grey-brown band. Discal spot large and dark brown with fine whitish central zone with a very broad grey-brown band. Discal postmedial line whitish, and yellow at base of wing; antemedial line on fore wing and to base of hind wing. Underside: fore and hind wings with basal zone to postmedial line whitish, and yellow at base of wing; outer zone with a very broad grey-brown band. Discal spot large and dark brown with fine whitish central streak on undersides of wings, but indistinct on upper side. Outer margin of wings almost smooth; hind wing with costa of moderate length and anal margin elongate. Veins Rs and M_1 of hind wing on short stalk.

Hind leg characters not known (legs missing or damaged in material examined). Abdomen without dorsal crests, and sternite 3 without setal patches; sternite 8 of male sclerotized medially, with a pair of widely spaced finger-like posterior processes. Cavus tympani with rake-like comb of fine spine-like projections at base of ansa.

**Male genitalia** (Figs 54, 93): Uncus strongly developed, a long rod, slightly curved and spatulate. Socii weakly sclerotized, short (less than half length of uncus), and oval. Gnathos with median process slender, finger-like. Valva not distinctly divided, but with slight development of costal lobe and sacculus; costal lobe protruding and with rounded apex, costa straight; sacculus forming a rounded lobe, much shorter than costal lobe; with strongly wrinkled dentate ridge distally, between costal lobe and sacculus. Coremata absent. Transtilla weakly sclerotized. Saccus protruding distinctly and rounded. Aedeagus short and broad, with one very long rod-like sclerotized posterior process flanked by a pair of shorter processes; vesica somewhat sclerotized, wrinkled and densely spinulose.

**Female genitalia.** Unknown.

**Diagnosis: Calleremites** can be recognized easily by its wing pattern, which has a dark olive area demarcated by curved antemedial and postmedial lines. The male genitalia are characterized by the rugose distal ridge between the costal lobe and sacculus, and the male abdomen by the modification of sternite 8.

**Distribution:** Oriental Region: China; India (Sikkim).

**Species included**

*subornata* Warren, 1894a (Calleremites) [male genitalia]

**CRYPSIPHONA MEYRICK, 1888** (Figs 5, 6, 45, 94, 130)

* Crypsiphona Meyrick, 1888: 836 (key), 901. Type species: *Crypsiphona melanosema* Meyrick 1888. [Treated in Section A of Geometrinae by McFarland (1988); here assigned to Pseudoterpnini.]

**Adults** (Figs 5, 6, 45): Antenna bipectinate in basal three-quarters or more in male, simple filiform in female. Frons not protruding significantly; with large well-defined black/brown area, or dark brown transverse line, or without distinct dark marking. Labial palpus with third segment tiny in both sexes, or sometimes moderate in length in female.

Wing pattern: whitish-grey or straw-coloured, with brown or grey speckles and other markings; antemedial line wavy, postmedial line dentate and angled, or lines broken and indistinct, or absent; discal spot forming a narrow dash or short line, sometimes indistinct (particularly on hind wing); whitish submarginal line broken and sometimes indistinct. Hind wing with pale basal zone and darker outer zone, but only weakly differentiated. Underside: fore and hind wings with large pale basal zone mainly white, white and straw-coloured, or cream, contrasting moderately to strongly with dark brown markings in outer zone (a band or large blotch on hind wing, smaller or occasionally absent on fore wing); dark discal spot on the fore wing varying from a small weak dot or dash to a well-defined larger blotch (the latter in proximity with two other dark spots); discal spot a weaker dot or dash on hind wing. Outer margin of wings slightly wavy; fore wing fairly elongate, hind wing with costa sometimes short, anal margin slightly, to fairly strongly, elongate.

Hind tibia without hair pencil; with only one pair of spurs. Thorax and tegulae with dense covering of long hair-like scales dorsally in *ocultaria*, but not in other species. Thorax and abdomen without dorsal crests; abdomen (*of occultaria* only) with double row of dark markings. Sternite 3 of abdomen without setal patches; segment 8 of male sclerotized and modified posteriorly, sternite projecting as a pair of lobes, tergite with a regular and dense marginal fringe of narrow scales including two groups each of two or three longer scales.

**Male genitalia** (Figs 55, 94): Socii large and sclerotized, apparently replacing uncus entirely, not fused but pressed together from sub-basally to about midlength, apical halves diverging and curved outwards, and with bifid tip. Gnathos entirely fused with membrane of diaphragma; median region of gnathos
slightly expanded but without spinules, and fused with, or at least adjoining, posterior end of transtilla. Valva moderately narrow, with costa on each distinctly or slightly asymmetrical and forming irregular ridges and processes; distal half of valva (or slightly less) divided into two main lobes; posterior lobe (not a continuation of the costa) lightly sclerotized, with apex bluntly rounded and sometimes strongly spatulate, or tapered; anterior lobe more or less finger-like. Core mata absent. Transtilla arched posteriorly as a pair of large, lightly sclerotized, lobes. Juxta forming a large pouch with a V-shaped postero-ventral margin. Saccus small or large. Aedeagus with a spine-like process at its posterior end, pointing at least slightly anteriorly.

Female genitalia (Fig. 130): Ovipositor valves strongly papillate and setose. Apophyses anteriores very short, much shorter than apophyses posteriores. Lightly sclerotized region present around ostium, tapering; anterior lobe more or less finger-like. Core mata absent. Transtilla arched posteriorly as a pair of large, lightly sclerotized, lobes. Juxta forming a large pouch with a V-shaped postero-ventral margin. Saccus small or large. Aedeagus with a spine-like process at its posterior end, pointing at least slightly anteriorly.

Diagnosis: Species of Crypsiphona are rather disparate in appearance, apart from sharing the character of reduction in hind tibial spurs, which does not occur widely in Geometrinae and is seen in Pseudoterpini only in Crypsiphona, Holoterpna, Hypobapta and Micotoschema. One of the strongest definitive characters of Crypsiphona is the modified abdominal male segment 8, with unique configuration of the tergite’s marginal fringe. In the male genitalia, the socii are unusual, and appear to have replaced the uncus entirely; the socii are pressed together sub-basally but not fused, and then flare outwards in the apical half, similar to those of Paraterpna, but the apices are bifid in Crypsiphona and not in Paraterpna. Another unusual character these two genera share is the gnathos fused with the membrane of the diaphragma; Mimandria and the flavibasalis-group of Herochroma also have the gnathos arms fused with the membrane of the diaphragma, but not the median projection of the gnathos.

Biological notes: Host plants: Myrtaceae: Eucalyptus spp., with particular reference to E. odorata Behr and E. diversifolia Bonpl. (McFarland, 1988: 257, for C. ocultaria). McFarland (1988: 257–261) described and figured the early stages of C. ocultaria: egg (fig. 806); larva (figs 807–815) pale maturing to dark green with tiny purplish speckles, and with a whitish cream to reddish spiracular line, body somewhat flattened dorsoventrally and with a pointed head, resting posture of mature larva rigid and stick-like; pupa (figs 816–821). For further accounts, and photographs of larvae, see Herbison-Evans & Crossley (website, updated 2005), and Common (1990: pl. 26, fig. 14).
Thorax and tegulae (and head) with dense covering of long hair-like scales dorsally. Hind tibia without hair pencil. Abdomen without distinct dorsal crests but with a double row of dark markings; sternite 3 without setal patches; segment 8 of male with a slightly sclerotized lobe at posterior end of sternite and sometimes also tergite.

**Male genitalia** (Figs 56, 95): Uncus vestigial. Socii strongly developed and sclerotized, long and rod-like except for broad base, strongly separated and diverging, with extreme apex outwardly curved and pointed. Gnathos absent or extremely weak. Valva divided slightly and bisected by a transverse ridge; costal lobe tapered and much longer than sacculus, sacculus tapered or rounded. Coremata absent. Transtilla lightly sclerotized. Juxta forming a large pouch with a V-shaped postero-ventral margin. Saccus distinctly lightly sclerotized. Aedeagus short and some-

**Female genitalia** (Fig. 131): Ovipositor valves strongly papillate and setose. Apophyses anteriores very short, much shorter than apophyses posteriores. Lamella postvaginalis weakly defined, sometimes with area of light sclerotization; lamella antevaginalis forming a weak lip or projecting lobe to ostium. Ductus bursae short or moderately short, and not particularly narrow; without sclerotized antrum. Corpus bursae moderate-sized and membranous, pear-shaped or rounded; lightly-sclerotized signum present, either with a serrate ridge at rim except at anterior end, or with one tiny tooth-like process.

**Diagnosis:** The general greyish colour of the moths, with dark streaks mainly along the veins, is characteristic and only likely to cause confusion with the very similar *Paraterpna*. The male genitalia of *Cyneoterpna* and *Paraterpna* differ distinctly: in the former the gnathos is absent and the valva is composed of two lobes with a ridge between them, whereas the latter has a gnathos and the valva is composed of three lobes. Both genera are in the minority of pseudoterpnae genera that have a signum in the female.

**Biological notes:** Host plants (for *C. wilsoni*): Myrtaceae: *Eucalyptus dives* Schauer (Common, 1990: 372), and *E. odorata* Behr (McFarland, 1979: 37, 1988: 262 for captive larvae). McFarland (1988: 262–266) described and figured the early stages of *C. wilsoni*: egg (figs 828–831); larva (figs 832–844) somewhat flattened dorsoventrally and generally similar to *Crypsiphona*, but with the head capsule projecting as a flat ridge, sharply cornered and slightly bicornute; pupa (figs 845–847).

**Distribution:** Australasian Region: Australia [New South Wales, South Australia, Tasmania (McQuillan, 2004)].

**Species included**
- *alpina* Goldfinch, 1929 (*Cyneoterpna*) [male and female genitalia]
- *wilsoni* (Felder & Rogenhofer, 1875) (*Hypochroma*) [male and female genitalia]

**DINDICA MOORE, 1888**

(Figs 8, 57, 96, 132)


**Adults** (Fig. 8): Antenna of male bipectinate, sometimes only in basal half but often much more, occasionally all except tip; rami longer than in *Lophophelma*; antenna simple filiform in female. Frons with lower part protruding strongly and angular; scales of frons coarse. Labial palpus entirely rough-scaled, third segment in female slightly elongate.

Wing pattern: fore wing usually grey- or olive-green, diffused with black- or red-brown scales or speckles, and often with dark longitudinal lines on and between the veins; antemedial line dentate, distinct or indistinct; discal spot forming a narrow dash or short line; postmedial line distinct from costa to vein M₃, then strongly angled, usually becoming broken or indistinct; white, dentate submarginal line often present from costa to M₃. Hind wing usually with large pale basal zone to postmedial line (bright yellow, cream, whitish, pinkish, or grey), but occasionally basal zone only slightly paler than outer zone; with outer zone a brown or black band, sometimes mixed with olive, occasionally broken; hind wing seldom with discal spot. Underside: fore and hind wings usually with basal zone yellow or dull white, outer zone usually with blackish or brown band, often broad, but sometimes narrow or broken, or occasionally absent; merging with postmedial line or separate; fore wing with discal spot forming a short broad band, hind wing with discal spot slender or weak, or absent. Outer margin of wings slightly to moderately wavy, fore wing sometimes moderately elongate; hind wing with costa not particularly short, but anal margin often elongate. Veins Rs and M₁ of hind wing not usually stalked, but on a stalk in *glaucescens*.

Hind tibia of male sometimes with hair pencil. Thorax and abdomen with dorsal crests strongly developed, especially on thorax. Sternite 3 of male abdomen with or without a pair of setal patches. Cavus tympani
usually with rake-like comb of fine spine-like projections at base of ansa.

**Male genitalia** (Figs 57, 96): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal one-third to four-fifths (approximately) fused; prongs usually very close together but occasionally well separated, almost straight, sometimes forming a tiny point at apex. Gnathos with median region often very broad and expanded, with margin slightly or distinctly bilobed, or forming a narrow tongue- or V-shaped process, strongly or occasionally weakly spinose or spinulose. Tegumen sometimes with dentate-edged and setose lateral lobes or processes. Valva divided distally into well-sclerotized variously shaped costal lobe and sacculus; costal lobe usually setose distally, often with apical process or spines, costa sometimes strongly expanded; sacculus broad, overlapping costal lobe and approaching or occasionally reaching its apex, often expanded subapically, usually with spine apical process or sometimes with apex divided. Coremata often strongly developed, but sometimes weak or absent. Transtilla with pair of arms, sometimes joined, weakly to well sclerotized. Saccus usually forming a small rounded process. Aedeagus moderately slender and sometimes short, often with a slender process arising medially and lying along the aedeagus.

**Female genitalia** (Fig. 132). Sternite 8 lightly to moderately sclerotized. Apophyses anteriores extremely short; very broad, complexly wrinkled and folded, sclerotized region present around ostium, forming shallow anterior pouch; lamella postvaginalis usually not clearly differentiated. Ductus bursae ranging from very short to long, often very narrow but sometimes moderately broad; sometimes lightly sclerotized but without distinct antrum. Corpus bursae small to large, usually membranous but occasionally wrinkled and weakly sclerotized posteriorly; signum absent.

**Diagnosis:** Moths of *Dindica* have a more strongly developed crest on the thorax than in other genera of Pseudoterpini. The wing pattern of *Dindica* is nearly always distinctive, with the hind wing (very different from the fore wing) having a large pale basal zone and usually a dark outer band, and discal spot absent or weak. *Heliomystis* is strikingly similar except that the hind wing has a larger discal spot on the underside, and some species of *Rhuma* have a contrasting dark outer band, but these moths are smaller than those of *Dindica* (compare scale of Figs 8, 41, 42). The male genitalia of *Dindica* have complex and variable structures of the divided valva, but the broad sacculus overlapping the costal lobe is distinctive except from *Dindicodes*, which unlike *Dindica* has an aedeagus of two diverging parts.

**Biological notes:** The larva (Sugi, 1987: pl. 14, fig. 3, *D. virescens*, and Holloway, 1996: 213, *D. polypheana*) is robust, leaf-green, with a fine, whitish lateral line and sometimes a yellow subdorsal one; sometimes also with a yellow line on the head. The resting posture is stick-like with the true legs held tightly against the head. (Holloway, 1996.) Host plants: Lauraceae: *Alseodaphne* (Robinson et al., 2001), *Benzoin*, *Lindera*, *Litsea* and *Parabenzoin* (Holloway, 1996); also Lauraceae: *Cinnamomum*, and Styracaceae: *Styrax* (Scoble, 1999); Euphorbiaceae: *Aporusa* (Robinson et al., 2001); Theaceae: *Camellia* (Robinson et al., 2001).

**Distribution:** Palaearctic Region: China; Japan; North Korea (Inoue, 1990); [South] Korea (Shin, 1996); Oriental Region: Bhutan; China; India; Indonesia (Bali, Flores, Java, Sulawesi, Sumatra); Malaysia; Myanmar; Nepal; Philippines; Taiwan; Thailand; Vietnam.

**Species included**
- *alaopis* Prout, 1932 (*Dindica*) [male and female genitalia]
- *discordia* Inoue, 1990 (*Dindica*) [male genitalia]
- *glaucescens* Inoue, 1990 (*Dindica*) [male genitalia]
- *hepatica* Inoue, 1990 (*Dindica*) [male genitalia]
- *kishidai* Inoue, 1986 (*Dindica*) [male genitalia; female genitalia photograph, Inoue (1990: fig. 119)]
- *limatula* Inoue, 1990 (*Dindica*) [male and female genitalia photographs, Inoue (1990: figs 107, 118)]
- *marginata* Warren, 1894a (*Dindica*) [male genitalia; female genitalia photograph, Inoue (1990: fig. 111)]
- *olivacea* Inoue, 1990 (*Dindica*) [male and female genitalia]
- *ovadai* Inoue, 1990 (*Dindica*) [male genitalia]
- *pallens* Inoue, 1990 (*Dindica*) [male genitalia]
- *para para* Swinhoe, 1891 (*Dindica*) [male and female genitalia]
- *erythropunctura* Chu, 1981 (*Dindica*)
- *para malayana* Inoue, 1990 (*Dindica*)
- *polyphaenaria* (Guenée, [1858]) (*Hypochroma*) [male and female genitalia]
- *basilavata* (Moore, 1868) (*Hypochroma*) [male genitalia]
- *purpurata* Bastelberger, 1911 (*Dindica*) [male and female genitalia]
- *semipallens* Inoue, 1990 (*Dindica*) [male genitalia]
- *subrosea* (Warren, 1893) (*Perissolophia*)[male genitalia]
- *subsimilis* (Warren, 1898) (*Perissolophia*)
Dindicodes Prout, 1912a (Figs 9–11, 58, 97, 133)

Dindicodes Prout, 1912a: 41. Type species: Hypochroma crocina Butler, 1880, by original designation. [Historical treatment of Dindicodes as a subgenus of Terpna, by Prout (1912a, 1927) indicates its inclusion, here confirmed, in Pseudoterpnini (of which Terpnini is a synonym).]

Adults (Figs 9–11): Antenna bipectinate with short rami in male, simple filiform in female. Frons protruding moderately to strongly. Labial palpus with third segment barely elongate in female.

Wing pattern: fore wing (crocina- and apicalis-groups) dark yellowish green diffused with black and reddish brown; antemedia line wavy or indistinct; postmedial line dentate and angled, but often indistinct or composed of small black spots on veins, angled outward in upper half; both lines sometimes with silver-grey shading on one side; submarginal line of most species composed of small pale speckles between veins; with or without white or pale spot at apex; discal spot forming a long and narrow dash. Hind wing (crocina-group): strong yellow, with large blackish discal spot; broad blackish terminal band broken, often composed only of large spots; most species (except crocina) with grey area spreading from wing base to discal spot and down towards anal angle. Hind wing (apicalis-group): similar to fore wing. Underside (crocina-group): fore wing yellow with dark brown or grey markings, grey area usually present at base or near dorsum, outer zone dark grey-brown overall or only at or near apex, dark postmedial line either broken but fairly distinct, or merely marked by one or two large spots; dark discal spot large; underside of hind wing similar to upper side. Underside (apicalis-group): fore and hind wings distinctly demarcated into two zones, large basal zone (to postmedial line) yellow and outer zone forming a dark broad band; discal spots small. Wing pattern (costiflavens-group): fore and hind wings, both upper side and underside, with broad band at outer margin, yellow with blackish speckles and spots (costiflavens with similar band at costa of fore wing, but ectoxantha with very extensive grey costal area); other parts of wings white with some grey spots. Outer margin of wings only slightly wavy; hind wing with costa sometimes short and with anal margin slightly elongate.

Hind tibia of male sometimes with hair-pencil; occasionally with terminal extension (stout in crocina). Thorax with moderate-sized crests; abdomen with dorsal crests developed moderately to strongly. Sternite 3 of male abdomen with or without a pair of setal patches.

Male genitalia (Figs 58, 97): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal one-third to more than half fused, prongs varying from very close together to well separated, straight. Gnathos with median process often V-shaped but sometimes broadly rounded or truncate and flat, spinulose. Valva divided distally; costal lobe lightly sclerotized and with rounded apex, but costal margin sclerotized and sometimes well-protruding, sometimes with long basal spinulose process; sacculus usually overlapping costal lobe (but occasionally only slightly), and approaching or occasionally extending beyond its apex, variously shaped, with lower margin projecting slightly to strongly, sometimes forming a distinct process. Coremata often strongly developed, but sometimes weak or absent. Transtilla weakly developed. Anellus sometimes with large sclerotized plate covered with minute ‘pimples’ and situated posteriorly to juxta. Saccus forming rounded small protrusion. Aedeagus divided near middle into two strong, diverging parts, and with large area of tiny spinules on main branch.

Female genitalia (Fig. 133): Apophyses anteriores much shorter than apophyses posteriores. Sternite 8 well sclerotized; wrinkled on ventral side, mainly around weakly defined lamella postvaginalis; very broad region around ostium lightly and fairly smoothly sclerotized. Ductus bursae short and very slender; without sclerotized antrum. Corpus bursae very long and membranous; signum absent.

Diagnosis: Dindicodes has various wing patterns in different species-groups, but the main group (crocina-group) can be easily recognized by the yellow hind wing, which has several large spots. The apicalis-group is distinguished by having a large yellow basal zone on the underside, while the upper side is mainly greenish brown, with a white apical spot on the fore wing. The costiflavens-group is characterized by having similar wing pattern on upper side and underside. All the species-groups have similar genitalia, and a characteristic of Dindicodes, present in all males, is...
that the aedeagus is well divided into two diverging parts from the middle. The aedeagus of a species of *Aeolochroma, saturaria*, is similar but does not have the tiny spinules that are present in *Dindicodes*.

**Distribution:** Palaearctic Region: China; Oriental Region: Bhutan; China; India; Myanmar; Nepal; Thailand; Vietnam.

**Species included**

crocina (Butler, 1880) (*Hypochroma*) [male and female genitalia]
albodavidaria (Xue, 1992) (*Pachyodes*) **comb. nov.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male genitalia]
davidaria (Poujade, 1895) (*Pachyodes*) **comb. rev.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male and female genitalia]
leopardinata (Moore, 1868) (*Hypochroma*) **comb. rev.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male and female genitalia]
euclidiaria (Oberthür, 1913) **comb. rev.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male genitalia]
moelleri (Warren, 1893) (*Dindicola*) **comb. rev.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male genitalia]

**apicalis-group**
apicalis (Moore, 1888) (*Pingasa*) **comb. rev.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male genitalia]
apicalis hunana (Xue, 1992) (*Pachyodes*) **comb. nov.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*]
harutai harutai (Yazaki, 1992) (*Pachyodes*) **comb. nov.** [from *Pachyodes*] [male and female genitalia]
harutai infuscatus (Yazaki, 1992) (*Pachyodes*) **comb. nov.** [from *Pachyodes*]

**costiflavens-group**
costiflavens (Wehrli, 1933) (*Terpna*) **comb. nov.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male genitalia]
ectoxantha (Wehrli, 1933) (*Terpna*) **comb. nov.** [formal publication of transfer by Han (2005, unpublished), from *Pachyodes*] [male genitalia]

**Species excluded**
vigil (Prout, 1926b) (*Terpna*) [male genitalia]
This species has a similar wing pattern to that of the crocina-group, but the very different male genitalia, with well-developed rod-like uncus, and long, strong, diverging, socii, excludes vigil from *Dindicodes*, although its correct generic placement is unknown.

**EPIPRISTIS MEYRICK, 1888**
(Figs 12, 59, 98, 134)

*Epipristis* Meyrick, 1888: 836 (key), 916. Type species: *Epipristis oxyrhma* Meyrick, 1888. [Cited in Pseudoterpnini by Holloway, 1996.]

*Terpnidia* Butler, 1892: 131. Type species: *Hypochroma nelearia* Guénée, [1858]. [Synonymized by Prout, 1912a: 29.]

*Pingarma* Sterneck, 1927: 147. Type species: *Pingarma transiens* Sterneck, 1927. [Synonymized by Prout, 1934c: 6, by inclusion of *transiens* in *Epipristis*.]

**Adults** (Fig. 12): Moths small [compare scale of Fig. 12 with Figs 13, 14 of *Herochroma*]. Antenna simple filiform in both sexes, or (*transiens*, male) bifidinate but with short rami. Frons protruding slightly, black and usually with smooth scales. Labial palpus with third segment slightly elongate in female.

Wing pattern: dull olive green, pale brown or grey, or straw-coloured; fore wing with dentate or wavy antemedial line, dentate postmedial line angled or curved, and white submarginal line; area outside postmedial line darker than basal zone (to postmedial line) of wing, usually forming band of diffuse whitish-edged spots (mingling with submarginal line and reddish brown or dull greyish green), especially in female; discal spot present on fore and hind wings as a dash, particularly on fore wing, but sometimes as a small spot. Underside: fore and hind wings with basal zone whitish or greyish, outer zone with broad or occasionally narrow black-brown band (absent in *transiens*), discal spot distinct and often forming a short dash. Outer margin of wings slightly wavy; hind wing rounded, with costa fairly short and anal margin fairly elongate.

Hind tibia usually without hair-pencil except in males of *transiens* and *nelearia*. Abdomen usually with distinct but not large dorsal crests, but these absent in *oxyrhma*. Sternite 3 of male abdomen usually without a pair of setal patches (but weakly present in *nelearia*).

**Male genitalia** (Figs 59, 98): Genitalia not heavily sclerotized. Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal half to two-thirds fused, prongs slender and tapered, very close together, almost straight. Gnathos with median process tongue-like and broad, with faint pimple-like markings. Valva not divided; narrow and usually long, with costal margin usually straight or slightly curved (but angled and with a process in *transiens*); with a longitudinal median ridge, usually narrow, bearing long slender spines (varying from one to many, usually forming a line) and usually also short dense setae (median ridge in *transiens* without spines or dense setae). Coremata membranous and indistinct but sometimes long. Transtilla with pair of arms project-
ing strongly posteriorly but often weakly sclerotized, separate or joined weakly (strongly developed in transiens). Saccus not usually a distinct process. Aedeagus usually weakly sclerotized posteriorly (transiens strongly); vesica with dense fine wrinkles.

**Female genitalia** (Fig. 134). Apophyses anteriores very short, much shorter than apophyses posteriores. Wrinkled and sclerotized region around ostium, and also wrinkled lamella postvaginaalis, present or absent. Ductus bursae very short or moderately long, with or without lightly sclerotized antrum, or occasionally ductus bursae entirely sclerotized. Corpus bursae usually fairly small (but extremely long in transiens), usually with narrower anterior caecum (not in transiens), membranous; signum absent, but scobinate region sometimes present.

**Diagnosis:** Epipristis resembles Mimandria (an Afro-tropical genus), and to some extent Herochroma, in the wing pattern, usually having a lacy band of whitish-edged spots between the postmedial and submarginal lines. Moths of Herochroma are usually larger, and Epipristis differs from that genus and Mimandria in the male genitalia, having a fairly simple and undivided valva, and a longitudinal median ridge that is spino-sectum except in the somewhat atypical species transiens. Pseudoterpna also has a spinose or sectose median ridge, but with the spines usually forming a patch, not a line as is usual in Epipristis. The vesica of the aedeagus of Epipristis has dense fine wrinkles, whereas in Pseudoterpna the wrinkles are not dense.

**Distribution:** Palearctic Region: China; Oriental Region: Bhutan; Brunei; China; India; Indonesia (Bali, Java, Sulawesi, Sumatra); Malaysia; Myanmar; Philippines; Singapore; Sri Lanka; Australasian Region: Australia; Indonesia [N. Moluccas: Bacan (Holloway, 1996)]; Papua New Guinea.

**Species included**

- *minimaria* (Guenée, [1858]) (Hypochroma) [male genitalia]
- *parvula* (Walker, 1860) (Hypochroma)
- *nelearia nelearia* (Guenée, [1858]) (Hypochroma) [male and female genitalia]
- *nelearia accesia* Prout, 1937 (Epipristis)
- *oxyccyma* Meyrick, 1888 (Epipristis) [male and female genitalia]
- *australis* Goldfinch, 1929 (Epipristis)
- *oxyodonta* Prout, 1934b (Epipristis)
- *rufilunata rufilunata* (Warren, 1903) (Pingasa)
- *nelearia viridans* Prout, 1916b (Epipristis)
- *rufilunata antelucana* Prout, 1927 (Epipristis)
- *storthophora* Prout, 1937 (Epipristis) [male genitalia]  
- *transiens* (Sterneck, 1927) (Pingarmia) [male and female genitalia]
- *truncataria* (Walker, 1861) (Acidalia) [male and female genitalia]

**HEROCROMA SWINHOE, 1893**  
(Figs 13, 14, 47, 60, 61, 99, 135)


*Chloroclydon* Warren, 1894a: 464. Type species: *Scotopteryx usneata* Felder & Rogenhofer, 1875, by original designation. [Synonymized with *Archeobalbis* by Prout, 1912a: 25, by inclusion of *usneata* in *Archeobalbis*; *Archeobalbis* synonymized with *Herochroma* by Holloway, 1996: 198.]


*Neobalbis* Prout, 1912a: 10 (key), 26. Type species: *Pseudoterpna elaearia* Hampson, 1903, by original designation. [Synonymized with *Archeobalbis* by Inoue, 1992: 156; *Archeobalbis* synonymized with *Herochroma* by Holloway, 1996: 198.]

**Adults** (Figs 13, 14, 47): Antenna of both sexes simple filiform. Frons protruding moderately, rough-scaled or smooth. Labial palpus with third segment slightly elongate in female.

Wing pattern: usually straw-coloured or grass-green diffused with grey- or red-brown. Antemedial line dentate or wavy, postmedial line dentate and on fore wing sometimes curved or occasionally angled; both lines black-brown, or mixed with red-brown, or dull green, distinct or indistinct; inner (basal) side of antemedial line usually with faint red- and black-brown blotch on each side of vein A, occasionally distinct; dark reddish-brown broken band or series of patches usually present between postmedial line and submarginal line, but absent or weak between veins M₃ and Cuₐ; submarginal line composed of pale markings and sometimes dark spots between the veins, distinct or indistinct. Fore and hind wings with discal spots, occasionally dash-like. Underside: fore and hind wings with large pale basal zone (to postmedial line) and dark outer zone usually distinctly demarcated but occasionally concolorous, basal zone whitish or yellowish, sometimes diffused with red or grey-brown; outer zone usually with dark brownish or red-brown band, often broad but sometimes narrow; discal spot on fore wing dot-like or occasionally a broad dash, that on hind wing either dot-like or a narrow dash, or absent. Outer margin of fore wing wavy, hind wing strongly wavy to dentate; tufts of raised scales sometimes
present near base of the male fore wing. Hind wing with costa sometimes short, and anal margin elongate.

Hind tibia of male often strongly dilated, with well-developed hair-pencil, but sometimes dilated moderately or not at all; with long terminal extension. Abdomen often with pairs of small dorsal crests. Sternite 3 of male abdomen with, or occasionally without, a pair of setal patches; sternite 8 (of flavibasalis-group only) with distal sclerotization, more or less produced medially.

**Male genitalia** (Figs 60, 61, 99): Uncus usually very short but sometimes moderately well developed, broad to rod-like, sometimes bifurcate. Socii diverging strongly, sometimes even laterally directed; well sclerotized and always much larger than uncus, strong, rather club-like or sometimes narrow, often with a small lobe on inner margin. Gnathos with median process small and somewhat spinulose, usually V-shaped to tongue-shaped but occasionally truncate. Valva variously shaped: undivided, divided into separate costal lobe and sacculus, or divided more distally into two lobes; costa often expanded, sometimes with basal, terminal, or occasionally medial process; sacculus sometimes forming distal spine, or with other process. Coremata strongly developed or weak. Transtilla with one or two pairs of processes projecting posteriorly, varying in shape, pointed or blunt, often well developed but sometimes weak. Sacculus with or without cornutus: a sclerotized bifid socii/uncus complex present (see p. 351 for discussion), fused only at base, consisting of vestigial uncus and large socii not diverging apically but with bi- or tri-furcate apex. Gnathos arms, but not median plate, fused with membrane of diaphragma; median region of gnathos expanded as a quadrate plate fused with or adjacent to posteriorly arched transtilla. Valva well divided distally into two slender setose lobes, and with another long slender setose process at base.

**Female genitalia** (Fig. 135): Ovipositor valves sometimes strongly papillate and setose. Apophyses anteriores sometimes extremely short but more often of moderate length, always shorter than apophyses posteriores. Very broad sclerotized region present around ostium, slightly to strongly wrinkled and variously shaped, sometimes complex and sometimes forming a shallow anterior pouch; lamella postvaginalis distinct or indistinct; lamella antevaginalis forming a pair of blunt processes in some. Ductus bursae short to long, usually moderately broad, lightly to well sclerotized, often wrinkled, sometimes with distinct antrum. Corpus bursae small to large, mainly membranous but sometimes sclerotized and wrinkled at posterior end; often with bicorne or linear signum, or signum absent.

**Diagnosis:** The wing pattern of *Herochroma* resembles that of *Epipristis* and *Mimandria* to some extent, in usually having a series of markings between the postmedial and submarginal lines, but not appearing as a lacy band, as is typical of those two genera; moths of *Herochroma* are usually larger (compare the scale of Figs 13, 14 with Figs 12, 23 of *Epipristis* and *Mimandria*). In the male genitalia, *Herochroma* is unusual in the Pseudoterpini in having a short uncus together with large socii. The uncus is variable and occasionally similar to that of *Metaterpna*, but the gnathos differs in the two genera; in *Herochroma*, unlike *Metaterpna*, no basal lobe is present on the gnathos arms. The combination of well-diverging and often somewhat club-like socii, and a strongly modified transtilla, is characteristic of many species of *Herochroma*. The flavibasalis-group differs in several characters as described above, most notably in having the gnathos arms fused with the diaphragma. That occurs also in *Mimandria*, but in both genera the median projection of the gnathos is not fused with the diaphragma, whereas in *Crypsiphona* and *Paraterpna* the gnathos is entirely fused. The last two genera are very different from *Herochroma* in external appearance [see Figs 5, 6 (*Crypsiphona*), Fig. 28 (*Paraterpna*) and Fig. 14 (*Herochroma flavibasalis-group*)].

**Biological notes:** Host plant(s): Araliaceae: Schefflera (Robinson et al., 2001, for *Herochroma* sp.).

**Distribution:** Palaearctic Region: Afghanistan (Inoue, 1999); Armenia? (‘Armenien Agri Dagh’); China; Kazakhstan; Tajikistan; Palaearctic/Oriental Region: Pakistan; Oriental Region: Bhutan; China; India; Indonesia [Bali and Flores (Inoue, 1999), Java, Sulawesi, Sumatra]; Jammu and Kashmir, Malaysia; Myanmar; Nepal; Philippines; Sri Lanka; Taiwan (Inoue, 1999); Thailan; Vietnam.

**Species included**

- *baba-group*
  - *aethalia* (Prout, 1927) (*Archaeobalbis*) [male and female genitalia photographs, Inoue (1999: figs 65, 91)]
  - *baba* Swinhoe, 1893 (*Herochroma*) [male and female genitalia]
  - *baibarana* (Matsumura, 1931) (*Dindica*) [male genitalia]
  - *orientalis* (Holloway, 1982) (*Archaeobalbis*) [synonymized by Inoue (1999: 90)]
crassipunctata (Alphé_ACKY, 1888) (Gno-
phos) [male and female genitalia photographs, Inoue
(1999: figs 76, 99)]
   sordida (Wehrli, 1928) (Archaebalbis) [synony-
mized by Inoue (1999: 97)]
crassipunctata farinosa (Warren, 1893) (Acteno-
chroma) [status changed to subspecies by Inoue (1999:
99)] [male genitalia photograph, Inoue (1999: fig. 77)]
cristata cristata (Warren, 1894a) (Actenochroma)
   [male and female genitalia]
   subopalina (Warren, 1894a) (Actenochroma) [male
   genitalia]
cristata rubicunda (Matsumura, 1931) (Dindica)
flavibasalis (Warren, 1894a) (Actenochroma) (syn-
nonymized by Inoue (1999: 83))
talis cristata (Warren, 1894a) (Actenochroma) [male
   genitalia]
   subspoliata (Prout, 1916a) (Archaebalbis) [status
   changed to species by Inoue (1999: 95)] [male and
   female genitalia]
   subtepens (Walker, 1860) (Actenochroma) [male
   and female genitalia]
   subtepens formosicola (Matsumura, 1931) (Dindica)
supraviridaria (Yazaki, 1994) (Archaebalbis) [male
   genitalia photograph, Inoue (1999: fig. 62)]
supraviridaria (Yazaki, 1994) (Archaebalbis) [male
   and female genitalia photographs, Inoue (1999: figs 61,
   88)]
urapteraria (Walker, 1860) (Actenochroma) [male
   and female genitalia photographs, Inoue (1999: figs 64,
   90)]
urapteraria eudicheres (Prout, 1916b) (Archaebal-
bis) [synonymized by Inoue (1999: 83)]
usneata (Fielder & Rogenhofer, 1875) (Scotopteryx?)
   [male and female genitalia photographs, Inoue (1999:
   figs 75, 98)]
   hypoglaucus (Hampson, 1895) (Pseudoterpn)
   viridaria viridaria (Moore, 1868) (Hypochroma) [male
   and female genitalia]
sobohracea (Warren, 1894a) (Actenochroma)
   viridaria peperata (Herbulot, 1989) (Archaebalbis) [status
   changed back to subspecies by Inoue (1999: 78)]
xuthopletes (Prout, 1934b) (Archaebalbis) stat. rev.
   [male genitalia photograph, Inoue (1999). Inoue
treated xuthopletes as a subspecies of subsopliata, but
the genitalia of the holotype (male) of xuthopletes are
distinctly different from those of the only male syn-
type of subsopliata.]
yazakii Inoue, 1999 (Herchroma) [male and female
   genitalia photographs, Inoue (1999: figs 60, 87)]
flavibasalis-group
   aeruginosa Inoue, 1999 (Herchroma) [male genitalia
   photograph, Inoue (1999: fig. 85)]
   clariscripta Holloway, 1996 (Herchroma) [male
   genitalia]
   flavibasalis (Warren, 1894a) (Actenochroma) [male
   and female genitalia]
   bipunctata (Thierry-Mieg, 1915) (Neobalbis) [male
   genitalia]
   hemiticheres (Prout, 1935b) (Neobalbis) [male and
   female genitalia]
   thaiensis (Inoue, 1992) (Archaebalbis) [synony-
mized by Inoue (1999: 101)]
mansfieldi (Prout, 1939) (Neobalbis) [male and female
   genitalia]
orosulata Han & Xue, 2003 (Herchroma) [male and
   female genitalia]

Species excluded
The following two species were transferred from
Hemistola Warren (in the Hemithei) to Herchroma
(Scoble, 1999). This was an error: the species do not
belong in Herchroma, and do not show any characters
of Pseudoterpnini. Both species are here returned to
Hemistola (comb. rev.).
   flavitincta (Warren, 1897b) (Hemistola?)
liliana (Swinhoe, 1892) (Thalassodes)

HOLOTERPNA PÜNGELER, 1900
   (Figs 15, 62, 100, 136)

Holoterpna Püngeler, 1900: 296. Type species: Holot-
erpna diaphrapharia Püngeler, 1900. [Cited in
Pseudoterpnini by Hausmann, 1996a, 2001.]

Adults (Fig. 15): Antenna bipectinate in basal three-
quarters or more in male, simple filiform or bi-
pectinate in female. Frons either not protruding
significantly or sometimes protruding slightly, smooth
scaled, mainly brown and contrasting distinctly with
Figures 134–140. Female genitalia. 134, Epipristis oxycyma; 135, Herochroma cristata cristata; 136, Holoterpa pruinosata; 137, Hypobapta percomptaria; 138, Hypodoxa emiliaria; 139A, Limbatochlamys pararosthorni; 139B, signum of Limbatochlamys pararosthorni; 140, Lophophelma vigens vigens.
white above frons (but paler and not contrasting in \textit{diagrapharia}). Proboscis absent or strongly reduced. Labial palpus with third segment very short in male, moderately long in female. Wing pattern: wings without strong markings, either plain and very pale olive-cream (hind wing sometimes slightly paler), with very faint, smoothly curved, postmedial line on fore wing darker or whitish, and with discal spot virtually cream (hind wing sometimes slightly paler), with very out strong markings, either plain and very pale olive-

### Male genitalia (Figs 62, 100): Sclerotized bifid soci/uncus complex present (see p. 351 for discussion), with basal two-thirds or more fused, prongs very close together, [tapered and] slender and almost straight. Gnathos with median region expanded as a short, minutely spinulose, tongue. Valva not divided; with small mid-basal lobe, or occasionally simple and without processes. Coremata usually present but not strongly developed. Transtilla usually with pair of arms not joined by sclerotization; each arm adjoining posterior region of light sclerotization on anellus. Juxta forming a broad, slightly bilobed, pouch. Saccus projecting distinctly, rounded or subrectangular. Aedeagus simple and usually slender; vesica without cornutii and only weakly wrinkled.

### Female genitalia (Fig. 136). Membrane between ovipositor valves sometimes modified (e.g. in \textit{pruinosa}) with a sclerotized median ridge defining a pair of flat curved lobes, or not modified. Apophyses anteriores very short, much shorter than apophyses posteriores. Region around ostium mainly membranous and without conspicuous features other than ostial opening sometimes wrinkled, and lamella postvaginalis sometimes distinct and lightly sclerotized. Ductus bursae short, wrinkled and sclerotized at ostium and with small band of sclerotization near corpus bursae, or mainly membranous. Corpus bursae membranous and small to moderate sized, pear shaped or oval; signum absent.

### Diagnosis: Moths of \textit{Holoterpna} are fairly plain on the underside, like those of \textit{Aplasta, Pseudoterpna, Mictoschema} and \textit{Mimandria}. These genera share characters of loss or reduction of the proboscis and/or the frenulum, but to varying degree, and the absence of a frenulum distinguishes \textit{Holoterpna} from \textit{Mimandria} and \textit{Pseudoterpna}. [See also the discussion under \textit{Aplasta}.] The male genitalia of \textit{Holoterpna} are distinguished from those of most of the above genera in having the valvae almost simple, not divided as in \textit{Mimandria}, or with a spinose harpe as in \textit{Aplasta} and \textit{Pseudoterpna}. The genitalia of \textit{Mictoschema} are similar, but the gnathos has a larger, although weaker, median region that is not tongue-like and minutely spinulose as in \textit{Holoterpna}.

### Biological notes: Host plants: (for \textit{H. pruinosa}): oliphaegous on Umbelliferae; records on \textit{Ferulago campestris} (Besser) Greescu and \textit{Foeniculum} spp. noted by Hausmann (2001: 119). The larva has been described as colourful, yellow with crimson/purple transverse strips, and without projections on the prothorax (T1) or the anal segment (Prout, 1935a).

### Distribution: Palaeartic Region: Israel; Italy and Lebanon (Hausmann, 1996b); Macedonia, Turkey (Hausmann, 2001); Turkmenistan; Afrotropical Region: Namibia; Zimbabwe.

### Species included

- \textit{diagrapharia} Püngeler, 1900 (\textit{Holoterpna}) [male genitalia]
- \textit{errata errata} Prout, 1922a (\textit{Holoterpna?}) [male genitalia]
- \textit{errata segnis} Prout, 1930a (\textit{Holoterpna}) \textit{pruinosa} (Staudinger, 1898) (\textit{Eucrostis?}) [male and female genitalia]

### HYPOBAPTA PROUT, 1912A

- \textit{Hypobapta} Prout, 1912a: 41. Type species: \textit{Hypochroma percomptaria} Guenée, [1858]. [Replacement name.] [Treated in Section A of Geometrinae by McFarland (1988); here assigned to \textit{Pseudoterpini}.]
- \textit{Hypochroma} Guenée, [1858]. Type species: \textit{Hypochroma percomptaria} Guenée, [1858]. [Junior homonym of \textit{Hypochroma} Herrich-Schäffer, [1855] 1850–1858 (Geometridae: Ennominae).]

### Adults (Fig. 16): Antenna of male bipectinate in basal two-thirds or more, simple filiform to serrate in female. Frons not protruding significantly, usually rough-scaled. Labial palpus with third segment short to moderate length, usually slightly longer in female than in male.

Wing pattern: grey-brown with blackish fine speckles and other markings, and with diffuse, pale, somewhat whitish areas mainly basal to the postmedial line; antemedial line slightly wavy, postmedial line

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dentate or almost smooth, sometimes slightly angled, both lines blackish and well marked, and sub-basal line also present (on fore wing only); discal spot forming a narrow line, often curved or wavy; whitish submarginal line wavy or dentate, distinct or indistinct. Underside: fore and hind wings with large pale basal zone white with dark brown speckles, and sometimes diffused with pink or brown, contrasting usually strongly with dark brown band (or on fore wing sometimes blotch) in outer zone; dark discal lines as on upper side. Outer margin of wings wavy; hind wing with costa sometimes fairly short, anal margin usually elongate.

Hind tibia without hair pencil; with one or two pairs of spurs. Thorax with large but low dorsal crest, abdomen with dorsal crests weak or absent. Sternite 3 of abdomen without setal patches.

**Male genitalia** (Figs 63, 101): Sclerotized bifid soci/uncus complex present (see p. 351 for discussion), fused only at base; prongs almost straight, well separated, and diverging; inner edge of each prong forming low rounded lobe at base. Gnathos with median region slightly broadened or otherwise differentiated, with or without spinules. Valva narrow, either divided (but with costal lobe much shorter than sacculus), or costa merely produced as a low irregular lobe (not making the valva distinctly divided); in either case, the costal lobe has a spine-like process (small to fairly large), and the sacculus or anterior part of the valva projects as a finger-like distal lobe. Coremata absent. Transtilla weakly sclerotized but sometimes large. Sacculus small or little developed. Aedeagus broadening to posterior end, which has two (or occasionally three) wrinkled and sclerotized diverging lobes; vesica with or without ceca, but always with one or more cornuti: spines, spine-like process, or a sclerite.

**Female genitalia** (Fig. 137): Ovipositor valves sometimes strongly papillate and setose. Apophyses anteriores shorter than apophyses posteriores, but longer than in most other genera of Pseudoterpnini. Very broad, wrinkled and lightly sclerotized, region usually present around ostium. Ductus bursae to ostium slightly to very strongly swollen and usually lightly sclerotized. Corpus bursae moderate-sized and membranous; signum absent.

**Diagnosis:** The greyish colouring and strong blackish lines on the wings of Hypobapta are distinctive. In the male genitalia, the soci/uncus complex (with prongs well separated, diverging, and fairly straight) is similar to that of Cynoletrina and some species of Hypodoxa. Hypobapta differs, however, in the simple finger-like anterior lobe of the valva, and the diverging posterior lobes of the aedeagus.

**Biological notes:** Host plants: Myrtaceae: Eucalyptus spp. (McFarland, 1988: 273, 278, for *H. diffundens* and *percomptaria*); McFarland (1979: 38–39) recorded Eucalyptus odorata Behr for *H. barnardi, diffundens* and *percomptaria*, and also Eucalyptus leucocylon F. Muell. for *H. percomptaria*. McFarland (1988: 273–283) described and figured the early stages of Hypobapta diffundens and percomptaria: egg (figs 884, 913–916); larva (figs 885–891, 917–929) pale green, becoming whitish blue-green, with minute and sometimes faint purplish speckles, spiracular line cream, body flattened dorsoventrally, head strongly pointed when mature, with a medial groove; usual resting posture of larva rigid and straight, when mature often hanging downwards from the hostplant; pupa (figs 892–896, 930–935).

**Distribution:** Australasian Region: Australia (Queensland, South Australia, Tasmania, Victoria).

**Species included**

- **barnardi** Goldfinch 1929 (Hypobapta) [male and female genitalia]
- **diffundens** (Lucas 1891) (Hypochroma) [male and female genitalia]
- **eugramma** (Lower 1892) (Hypochroma)
- **percomptaria** (Guenée, 1858) (Hypochroma) [male and female genitalia]
- **xnemompha** (Lower, 1915) (Pseudoterpnini)

**Hypodoxa Prout, 1912A**

(Figs 17, 64, 102, 138)

**Hypodoxa** Prout, 1912a: 10 (key), 33. Type species: Hypochroma emiliaria Guenée, [1858]. [Here assigned to Pseudoterpnini.]

**Adults** (Fig. 17): Antenna of male bipectinate in basal two-thirds or more, simple filiform in female. Frons protruding slightly or occasionally moderately, not strongly rough-scaled; occasionally with black transverse band or with lower part of frons black. Labial palpus with first and second segments rough-scaled, third segment very short to moderate length in male, fairly elongate in female.

Wing pattern: typically olive-green mottled with dark brown speckles and other markings, but sometimes mainly brown or greyish; with or without large areas of pale whitish grey or cream, occasionally predominantly pale; often pink-tinged, and often with yellow fringe along anal margin of hind wing (and also along sides of abdomen); fore wing with or without distinct pale basal zone (to postmedial line); antemedial line dentate or indistinct; discal spot either forming a small dash or a dot; postmedial line wavy or dentate, curved or angled, usually with paler outer edge; sub-
marginal line often whitish with dark edge but sometimes predominantly dark, wavy but sometimes indistinct; fore wing usually with two dark but diffuse patches at outer margin; hind wing sometimes with dark streak situated in anal margin and tapering from outer margin towards base of wing. Underside: fore and hind wings usually with strongly demarcated dark outer zone or band, and pale basal zone (yellowish or whitish, often with pink tinge on fore wing); discal spot often distinct, usually stronger on fore wing, but sometimes indistinct or, on hind wing, absent. Outer margin of wings slightly wavy; hind wing rounded, with costa short and anal margin elongate, and with dark-edged hair brushes either as three tufts, or joined in a wavy, or occasionally almost straight, slanting line, but usually with tuft at anal margin of wing projecting more strongly, clearly basal to the discal spot (if discal spot is visible); tufts of raised scales usually also present, to varying degree, near base of fore wing.

Hind tibia of male with hair pencil and with short terminal extension. Thorax and abdomen with weak dorsal crests. Sternite 3 of male abdomen with a very weak pair of setal patches, widely spaced.

**Male genitalia** (Figs 64, 102): Sclerotized bifid soci/uncus complex present (see p. 351 for discussion), with basal one-quarter to half fused, prongs moderately to strongly separated at base and diverging, parallel or converging. Gnathos quadrato to rounded, with narrow median process often spinulose, tongue-like or variably shaped. Valva not divided, typically with non-costal side folded over, and always with a ridge-like process on that side, distal and spinulose. Coremata absent. Transtilla arms not joined, well apart. Saccus very large, with rounded apex. Aedeagus with fine longitudinal ridges in posterior half, becoming wrinkled distally, merging with vesica; aedeagus often with median tongue-like process; vesica without cornuti.

**Female genitalia** (Fig. 138): Apophyses anteriores extremely to moderately short, always much shorter than apophyses posteriores. Very broad, densely wrinkled region often present around ostium, lightly sclerotized or almost membranous. Ductus bursae with or without longitudinal ridges, ductus often merging with corpus bursae. Corpus bursae mainly membranous, slender, moderately to greatly elongate; signum absent.

**Diagnosis:** Moths of *Hypodoxa*, *Sundadoxa* and *Pingasa* all have brushes of hair-like scales on the hind wings. In *Hypodoxa* the brush is often composed of three tufts and even if they are joined, they do not form quite such a straight bar as in *Sundadoxa*; in both those genera the brushes are situated more basally (in relation to the discal spot) than in *Pingasa*. The male genitalia of *Hypodoxa* have two definitive characters: the distal, spinulose, ridge-like process on the valva, and the conspicuously large saccus.

**Biological notes:** Host plants: Myrtaceae: *Eucalyptus* and *Angophora* (Common, 1990: 372, for *H. bryophylla*); mainly *Eucalyptus* ?polycarpa* F. Muell. but also *E. drepanophylla* F. Muell. (McFarland, 1979: 39, for *H. emiliaria*); *Leptospermum* (McFarland, 1988: 228, for *H. calliglauca*); *Melaleuca quinquenervia* (Cav.) Blake (Robinson et al., website, 2005, for *H. erebusata*). McFarland (1979) noted that the larva of *emiliaria* bore a close superficial resemblance to that of *Cryptsiphona ocultaria*. For an account of the early stages of *H. bryophylla*, with photographs, see Herbison-Evans & Crossley (website, updated 2005).

**Distribution:** Australasian Region: Australia; Indonesia (Irian Jaya, Moluccas); Papua New Guinea; Solomon Islands.

**Species included**
- *bryophylla* (Goldfinch, 1929) (*Pingasa*)
- *calliglauca* (Turner, 1926) (*Pingasa*)
- *conspurcata* (Lucas, 1898) (*Hypochroma*)
- *myriosticta* (Turner, 1904) (*Pseudoterpna*)
- *corrosa* (Warren, 1907) (*Hypochroma*) [female genitalia]
- *deteriorata* (Walker, 1860) (*Hypochroma*) [male and female genitalia]
- *nigraria* (Felder & Rogenhofer, 1875) (*Boarmia*)
- *emiliaria emiliaria* (Guenée, [1858]) (*Hypochroma*) [male and female genitalia]
- *assidens* (Lucas, 1901) (*Hypochroma*)
- *aurantiaecea* (Lucas, 1891) (*Hypochroma*)
- *subornata* (Warren, 1896d) (*Hypochroma*)
- *talagi* (Swinhoe, 1917) (*Pingasa*)
- *emiliaria aignanensis* Prout, 1916b (*Hypodoxa*)
- *emiliaria basingina* (Warren, 1902a) (*Hypochroma*)
- *emiliaria fulgurea* Prout, 1913 (*Hypodoxa*)
- *emiliaria purpurifera* (Warren, 1899a) (*Hypochroma*)
- *emiliaria purpurissata* (Lucas, 1901) (*Hypochroma*)
- *emiliaria subleprosa* Prout, 1917a (*Hypodoxa*)
- *erebata* (Walker, 1860) (*Hypochroma*)
- *erebata* (Meyrick, 1888) (*Hypochroma*)
- *horridata* (Walker, [1863]) (*Hypochroma?*)
- *involuta* Prout, 1933 (*Hypodoxa*) [male genitalia]
- *involuta perplexa* Prout, 1933 (*Hypodoxa*)
- *leprosa leprosa* (Warren, 1907) (*Hypochroma*)
- *leprosa incarnata* Prout, 1913 (*Hypodoxa*)
- *lichenosa lichenosa* (Warren, 1907) (*Hypochroma*)
- *lichenosa rufomixta* Prout, 1913 (*Hypodoxa*)
- *multicolor* (Warren, 1899a) (*Hypochroma*) [male genitalia]
- *multicolor circumsepta* Prout, 1913 (*Hypodoxa*)
**Limbatochlamys Rothschild, 1894**

*Limbatochlamys* Rothschild, 1894: 540. Type species: *Limbatochlamys rosthorni* Rothschild, 1894, by original designation. Han, Galsworthy & Xue, 2005. [Cited in Pseudoterpini by Han, Galsworthy & Xue, 2005.]

**Adults** (Fig. 18): Moths large (compare scale of Fig. 18 with Figs 1–3, 5–17). Antenna in both sexes bipectinate with short rami (much shorter in female), or sometimes serrate in female. Frons protruding moderately, rough-scaled. Labial palpus short. Wing pattern: fore wing mainly uniform olive-green, with straw-coloured costal band distinctly bordered by a black line at lower margin; hind wing with straw-coloured costal area, spreading downwards into large diffuse grey-green area, which runs from outer margin to anal angle and often across wing to base; costal band of fore wing and most areas of hind wing speckled with dark brown. Postmedial line of fore wing composed merely of a row of dots (sometimes indistinct) on veins, or a faint, slightly dentate line; postmedial line of hind wing dark brown, dentate. Discal spot faint on fore wing, forming a distinct or faint dash on hind wing, or absent. Underside: pale brown, with dark speckles (sparse or absent towards base); postmedial line usually present on fore wing but only occasionally on hind wing; with or without discal spot. Outer margin of wings almost smooth; fore wing with costa curved towards slightly falcate apex. Hind wing with costa of moderate length and with fairly elongate anal margin. Hind tibia without hair pencil. Abdomen without dorsal crests, and sternite 3 without setal patches.

**Male genitalia** (Figs 65, 103): Uncus well developed, rod-like, long and slender. Socii sclerotized, very slender, slightly narrower than uncus, about half length of uncus. Gnathos with median process V-shaped, hook or finger-like. Valva long and often fairly narrow, divided apically (*rosthorni*) or not divided; with costa, harpe and sacculus region well sclerotized, other parts weakly sclerotized; costa often produced as apical spine-like process, spinulose or smooth; harpe not approaching apex of valva, with apex bluntly rounded or narrow and pointed, without spinules. Coremata well developed. Transtilla weakly sclerotized, forming a pair of arms, more or less meeting medially. Saccus rounded and projecting moderately. Aedeagus moderately broad, with two sclerotized processes arising medially, variously shaped, one lying over the other; vesica with pointed apical cornutus.

**Female genitalia** (Fig. 139). Apophyses anteriores very short to moderate length but much shorter than apophyses posteriors. Broad, wrinkled and heavily sclerotized, region present around ostium, merging with lamella postvaginalis. Ductus bursae short, moderately narrow, and without distinct antrum. Corpus bursae large or moderate-sized; mainly membranous but sometimes with lightly sclerotized area and with wrinkles; signum a well-developed subtriangular plate, with a tooth at each of the two anterior corners.

**Diagnosis:** *Limbatochlamys* is characterized by its fore wing pattern, uniformly olive-green except for the straw-coloured costal band, and also by the fore wing shape, slightly falcate at the apex. *Limbatochlamys* is one of only a few pseudoterpine genera to have male genitalia with both a long rod-like uncus and socii. Other genera are *Actenochroma*, which (unlike *Limbatochlamys*) has a spinulose harpe reaching the apex of the valva, and *Psilotagma*, which is sometimes similar to *Limbatochlamys* in having narrow socii, but differs in not having a harpe in the valva. *Limbatochlamys* is also one of only three pseudoterpine genera that have a bicornute signum in the female, the others being *Actenochroma* and (some species) *Herochroma*.

**Distribution:** Palaearctic Region: China; Oriental Region: China.

**Species included**

- **rosthorni** Rothschild, 1894 (*Limbatochlamys*) [male and female genitalia]
- **pararosthorni** Han & Xue, 2005 (*Limbatochlamys*) [male and female genitalia]
- **parvisis** Han & Xue, 2005 (*Limbatochlamys*) [male and female genitalia]

**Lophophelma Prout, 1912A**

*Lophophelma* Prout, 1912a: 40. Type species: *Hypochroma vigens* Butler, 1880. [Cited in Pseudoterpini by Holloway, 1996.]

**Adults** (Fig. 19): Antenna of male bipectinate in basal half to two-thirds, and simple filiform in female (female of *neonoma* bipectinate but with short rami). Frons protruding moderately to strongly, with blackish transverse band either median and diffuse or occa-
sionally broken, or at ventral margin and distinct. Labial palpus short, third segment slightly elongate in female.

Wing pattern: usually diffused grey- or red-brown, or grey-green, with black speckles and striations; fore wing usually with apical or subapical paler blotch (rubrooviridata and ruficosta without such blotch); fore wing with distinct sub-basal line or occasionally a band, and distinct antemedia and postmedial lines, antemedia line slightly or strongly sinuate; fore and hind wings with postmedial line dentate, often strongly, postmedial line on fore wing angled outward at upper half; submarginal line composed of white spots (distinct or indistinct) between veins. Discal spot distinct and often forming a dash on upper side and underside of fore wing, on hind wing usually narrow but sometimes faint on upper side, and present or absent on underside. Underside: fore and hind wings with basal zone (to postmedial line) whitish, or yellowish but only at base of wing, and fore wing sometimes with pink in the lower part, outer zone with dark brown band, often broad but sometimes narrow or broken. Outer margin of wings wavy; hind wing rounded, with costa short and anal margin fairly strongly elongate.

Hind tibia of male with or without hair pencil. Abdomen with well-developed dorsal crests; sternite 3 of male with or without a pair of weak setal patches.

**Male genitalia** (Figs 66, 104): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal half to three-quarters fused; prongs very close together, straight. Gnathos with median process usually V-shaped, or occasionally tongue-like, often narrow but sometimes broad, spinulose. Valva extremely variable in shape, often moderately short and undivided, or divided into separate costal lobe and sacculus, or divided more distally into two lobes; costa often with variously-shaped process at base; sacculus variable, but often with apex narrow, or tapered and pointed, and dentate or spinulose. Coremata weak to moderately well developed, or sometimes absent. Transtilla weakly sclerotized. Saccus (in taiwana only) slightly bifurcate with widely diverging lobes. Aedeagus short and moderately broad, usually with posterior part more sclerotized and with large area of spinules, but occasionally without spinules; occasionally with two posterior processes; vesica usually without cornuti but occasionally with a small cornutus.

**Female genitalia** (Fig. 140): Sternite 8 lightly to moderately sclerotized. Apophyses anteriores extremely short, much shorter than apophyses posteriores. Very broad, wrinkled and sclerotized region present around ostium; sometimes with rounded and wrinkled lamella postvaginalis. Ductus bursae without distinct antrum; ductus bursae very short, moderately sclero-

tized or almost membranous, fairly narrow but broader than in Dindictodes. Corpus bursae large, membranous, or lightly sclerotized and wrinkled at posterior end; signum absent.

**Diagnosis**: Moths of Lophophelma can usually be recognized by a combination of the following characters (not necessarily all present in each species): dark striations on fore and hind wings, postmedial line often well marked and strongly dentate, and hind wing elongate. Other genera that have striations on both fore and hind wings are Pachista and Metallothelia, but Lophophelma does not have the basal dark markings on the underside of the wings that are characteristic of Pachista, or the dark-ringed pale-centred discal spots of Metallothelia. The apicalis-group of Dindictodes also have striations on both wings, but they have a much larger yellow zone on the underside than the small yellow patch diffused from the base of the wing that occurs in some species of Lophophelma. In the male genitalia the valva is extremely variable, but the sacculus often terminates in a narrow or pointed process. This is by no means unique to Lophophelma, but when present it does distinguish the genus from Pachyodes, which resembles Lophophelma in some other respects – including a large spinulose area on the aedeagus. (Holloway (1996) considers the possibility that Lophophelma might be paraphyletic in relation to Pachyodes).

**Distribution**: Palearctic Region: China; Oriental Region: Brunei; Bhutan; China; India; Indonesia (Java, Sulawesi, Sumatra, Sumbawa); Malaysia; Nepal; Philippines; Singapore; Sri Lanka; Taiwan; Thailand; Vietnam.

**Species included**
albapex (Inoue, 1988) (Pachyodes) comb. nov. [from ‘Pachyodes’][1] [male genitalia photograph, Inoue (1988: fig. 2:b)]
calaurops (Prout, 1912a) [Terpna (Lophophelma)] [male and female genitalia]
costistrigaria (Moore, 1868) (Hypochroma) comb. rev. [formal publication of transfer by Han (2005), from ‘Pachyodes’][2] [male genitalia]
erionoma erionoma (Swinhoe, 1893) (Pachyodes) [male genitalia]

furvirubens (Prout, 1934b) [Terpna (Lophophelma)] [male genitalia]
erionoma albicomitata (Prout, 1927) (Terpna) [male genitalia]
eroionoma kiangsiensis (Chu, 1981) (Terpna)
neroionoma subnubigosa (Prout, 1927) (Terpna) [male
and female genitalia]
erionoma imitaria (Sterneck, 1928) (Terpna)
eucyphes (West, 1930) (Terpna)
eupines (West, 1930) (Terpna)
funebrosa funebrosa (Warren, 1896c) (Terpna) [male genitalia]
funebrosa tenuilinea (Warren, 1899a) (Terpna) iterans iterans (Prout, 1926a) (Terpna) comb. nov. [formal publication of transfer by Han (2005), from ‘Pachyodes’] [male genitalia]
iterans onerosus (Inoue, 1970) (Terpna) comb. nov. [formal publication of transfer by Han (2005), from ‘Pachyodes’]
loncheres (Prout, 1931b) (Terpna) [male genitalia]
luteipes luteipes (Felder & Rogenhofer, 1875) (Pachyodes) [male genitalia]
similis (Moore, 1888) (Pingasa) luteipes enthusiasts (Prout, 1927) (Terpna) [male and female genitalia]
neonoma (Hampson, 1907) (Pseudoterpna) [male genitalia]
niveata (Debauche, 1941) (Terpna) [male genitalia]
obtecta (Debauche, 1941) (Terpna) [male genitalia]
pingbiana (Chu, 1981) (Terpna) comb. nov. [formal publication of transfer by Han (2005), from Terpna]
rubroviridata (Warren, 1898) (Terpna) [male genitalia]
ruficosta (Hampson, 1891) (Pachyodes) [male genitalia]
taiwana (Wileman, 1912) (Pachyodes) comb. rev. [formal publication of transfer by Han (2005), from ‘Pachyodes’] [male genitalia]
varicoloraria (Moore, 1868) (Hypochroma) comb. rev. [formal publication of transfer by Han (2005), from ‘Pachyodes’] [male genitalia]
vigens vigens (Butler, 1880) (Hypochroma) [male genitalia]
vigens ruficoloraria (Warren, 1897a) (Terpna) [female genitalia]

**METALLOLOPHIA WARREN, 1895**
(Figs 20, 67, 105, 141)


Adults (Fig. 20): Antenna variable in male, bipec- tinate but with short rami, or simple filiform, or lamellate (e.g. in type species, viticosta); simple filiform in female. Frons protruding slightly to moderately. Labial palpus short, strong, third segment minute in male, in female sometimes slightly elongate.

Wing pattern: wings with a degree of sheen; usually diffused greenish, brownish, and often with a tinge of purple; fore wing often with a broad, pale, diffuse or distinct, band or zone below costa. Antemedial and postmedial lines sinuous or dentate, postmedial distinct or indistinct, usually strongly angled or curved in upper half of fore wing, or occasionally not angled; submarginal line usually indistinct. Fore and hind wings with discal spot, usually pale-centred and bounded by a dark line, often large on fore wing. Underside: fore and hind wings with basal zone (to postmedial line) often paler, purple-tinged, and with strong yellow spreading from base; outer zone usually a broad purplish or brown hand, sometimes also with broad postmedial line; fore wing with large discal spot, pale-centred or not, and usually with a black or dark purple spot basal to discal spot, and a purplish streak below the basal spot; hind wing with discal spot large or small, pale-centred or solid, or absent. Outer margin of wings wavy or smooth; hind wing with costa occasionally short, anal margin slightly to distinctly elongate. Veins Rs and M₁ of hind wing not usually stalked but on a stalk in variegata.

Hind tibia of male with or without hair pencil. Abdo- men with small to well-developed dorsal crests, some- times ‘metallic’ and glossy. Sternite 3 of male abdomen often with but sometimes without a pair of setal patches, sometimes the two patches merging.

**Male genitalia** (Figs 67, 105): Uncus weakly develop- ed, very short and rounded or subtriangular, hollow and open ventrally. Socii very large and stout, close together but diverging apically, tapered and forming a point at apex. Gnathos often with a pair of weakly sclerotized, usually well separated, median lobes or narrow processes, or merely slightly expanded at median region. Valva broad, sometimes appearing divided but with costal lobe much larger than saccu- lus; valva with well-sclerotized costa, sacculus, and basal lobe (a large lobe extending from base of valva often to mid-length of valva), but other areas of valva weakly sclerotized; costa expanded apically and with a dense patch of ramose-tipped setae; sacculus forming a strong process, narrow or club-shaped, spinose or spinulose (chiefly at apex); basal lobe of valva usually with minute pimple-like spinules. Coremata varying from well developed to weak or absent. Transtilla often weakly developed, with a pair of arms sometimes projecting posteriorly. Anellus often lightly sclero- tized. Saccus often not projecting distinctly, but project- ing and rounded in some species. Aedeagus moderately slender to moderately broad, with a sclero- waited finger-like posterior process bearing a row of short spines; vesica with large cornutus, often slightly bifid at apex.

**Female genitalia** (Fig. 141). Anterior margin of stern- ite 8 usually extended ventrally as a narrow sclero- tized ring, but occasionally weak or unmodified (this structure is possibly formed from modified apophyses anteriores, which are otherwise absent). Broad region around ostium often lightly to moderately sclerotized and wrinkled; lamella postvaginalis indistinct or
occasionally distinct. Ductus bursae short to moderate length, usually broad and sometimes very broad; without distinct antrum. Corpus bursae small to large, mainly membranous but sometimes lightly sclerotized and wrinkled at posterior end; signum absent.

Diagnosis: The usually pale-centred discal spots of Metallophilia are distinctive except that similar ones occur in some species of Aeolochroma and Rhuma. However, Metallophilia alone has the characteristic markings on the underside of the fore wing, of dark marks basal to a large discal spot. Metallophilia is unusual in the structure of the valva of the male genitalia, which has a ramose-tipped setal patch on the costa, and a large basal lobe. In the female genitalia, the narrow sclerotized ring usually extending from the anterior margin of sternite 8 (but not in the type species vitticosta) is also unique.

Distribution: Palaearctic Region: China; Oriental Region: Brunei; China; India; Indonesia (Sumatra); Malaysia; Philippines; Thailand; Vietnam.

Species included
albescens Inoue, 1992 (Metallophilia) [male and female genitalia]

ostrumaria Xue, 1992 (Metallophilia) [synonymized by Han & Xue, [2004]]

arenaria (Leech, 1889) (Pachyodes) [male and female genitalia]
danielaria (Oberthür, 1913) (Hypochroma)
assamensis Orhant, 2000 (Metallophilia) [male genitalia]
cineracea Holloway, 1996 (Metallophilia) [male and female genitalia]
cuneataria Han & Xue, [2004] (Metallophilia) [male and female genitalia]
decesii Herbolut, 1989 (Metallophilia) [male and female genitalia]
flavomaculata Han & Xue, [2004] (Metallophilia) [male genitalia]
inanularia Han & Xue, [2004] (Metallophilia) [male genitalia]
medullosa Inoue, 1988 (Metallophilia) [male and female genitalia]
ocellata (Warren, 1897b) (Terpna ?) [male genitalia]
opalina (Warren, 1893) (Terpna) [male and female genitalia]
purpurivenata Han & Xue, [2004] (Metallophilia) [male and female genitalia]
stueningi Han & Xue, [2004] (Metallophilia) [male genitalia]
subradiata (Warren, 1897c) (Terpna) [male and female genitalia]
variegata Holloway, 1996 (Metallophilia) [male genitalia]

vitticosta (Walker, 1860) (Hypochroma) [male and female genitalia]

METATERPNA YAZAKI, 1992
(Figs 21, 68, 106, 142)

Metaterpna Yazaki, 1992: 8. Type species: Terpna differens Warren, 1909. Genus currently under study by HX. Han and D. Stüning. [Type species previously included in Pachyodes, which was cited in Pseudoterpnini by Holloway, 1996; Metaterpna is here formally assigned to Pseudoterpini.]

Adults (Fig. 21): Antenna bipectinate with short rami in male, simple filiform in female. Frons protruding slightly to moderately, rough-scaled. Labial palpus with third segment of moderate length in male, longer in female.

Wing pattern: fore wing brown, sometimes olive-tinged; antemedial line pronounced, black and oblique; black postmedial line dentate and angled; with pinkish white or indistinct red brown subapical patch outside postmedial line (thyatiraria with another large whitish patch at anal angle); submarginal line indistinct. Hind wing with very large basal zone (to postmedial line) cream or greyish, outwards from postmedial line with diffuse darker band or olive and dark brown markings; postmedial line mainly smooth, lower half sometimes weak, with another dark brown line (dentate and entire or broken) situated along insides. Discal spot on upper side and underside of wings forming a narrow dash, or sometimes absent on hind wing. Underside: generally somewhat fainter than upper side, except postmedial line often dark and distinct. Outer margin of wings wavy; hind wing with costa moderate in length and anal margin slightly elongate.

Hind tibia without hair-pencil. Dorsal crests moderately developed on thorax and strong on abdomen. Sternite 3 of abdomen without setal patches.

Male genitalia (Figs 68, 106): Uncus strongly developed and fairly stout, with apex slightly bifid or with a pair of diverging processes. Socii very large, tapered, sclerotized part situated posteriorly from base of uncus, reaching to level of apex of uncus or projecting beyond it, and strongly diverging. Gnathos with median region expanded, tongue-like and spinulose; lateral arms expanded and strongly developed, forming a short lobe near where the base adjoins the uncus. Valva not divided, broad but tapered apically; costa convexly curved and expanded, with process at base, small and blunt, or finger-like and spinulose; sacculus a rounded lobe, distinct or indistinct, with a curved ventral ridge forming a shallow pocket medially, and a wavy ridge at base, near lower margin. Coremata absent. Transtilla with a pair of lightly sclerotized
arms. Saccus projecting and rounded. Aedeagus slender, with long narrow pointed apical process.

**Female genitalia** (Fig. 142): Ovispositor valves strongly sclerotized, irregularly papillate and with a few ridges on inner margin. Apophyses anteriores much shorter than apophyses posteriores. Very broad, sclerotized and sometimes wrinkled, region present around ostium, sometimes forming a band; lamella postvaginalis well defined. Ductus bursae narrow and fairly long, without distinct antrum. Corpus bursae moderately small, membranous; signum absent.

**Diagnosis:** *Metaterpna* can usually be recognized by the wing pattern, in which the hind wing is paler than the fore wing, and has a distinct postmedial line. A similar postmedial line occurs occasionally in *Dindica* (e.g. *limatula*), but *Metaterpna* differs distinctly from *Dindica* in having the valvae undivided in the male genitalia. *Metaterpna* is characterized by its genitalia, with basal lobes on the gnathos arms in the male. The combination of large socii and a bifid uncus is another distinctive character, except that it is seen also in some species of *Herochroma*. The ovipositor lobes of the female of *Metaterpna* are more strongly sclerotized and irregularly shaped than in other *Pseudoterpnini*.

**Distribution:** Palaeartic Region: China; Oriental Region: China; India; Nepal.

**Species included**
- *differens* (Warren, 1909) (*Terpna*) [male and female genitalia]
- *thyatiraria* (Oberthür, 1913) (*Hypochroma*) [male and female genitalia]
- *thyatiroides* (Sterneck, 1928) (*Dindica*)

**MICTOSCHEMA PROUT, 1922A**

(Figs 22, 69, 107, 143)

*Mictoschema* Prout, 1922a: 153. Type species: *Mictoschema swierstrai* Prout, 1922a. [Here assigned to Pseudoterpnini.]

**Adults** (Fig. 22): Antenna bipectinate to near apex in male, lamellate in female. Frons sometimes protruding slightly, blackish brown and smooth scaled. Proboscis absent. Labial palpus with third segment very short in male, sometimes slightly longer in female.

Wing pattern: mottled mid to dark grey-brown; fore wing with slightly wavy antemedial line, postmedial line irregularly dentate, lines occasionally faint; diffuse submarginal line cream coloured but often broken and indistinct; discal spot usually present on fore and hind wings, sometimes just a tiny dot. Underside of wings paler than upper side and lines absent or indistinct; usually with faint, diffuse, darker outer band, present at least apically on fore wing, and sometimes on hind wing but usually very weak; discal spots more distinctly than on upper side. Outer margin of wings very slightly wavy; hind wing with costa often fairly short, anal margin usually elongate. Frenulum and retinaculum absent.

Hind tibia without hair pencil; with either one or two pairs of spurs. Thorax and abdomen with dorsal crests. Sternite 3 of abdomen without setal patches.

**Male genitalia** (Figs 69, 107): Genitalia not heavily sclerotized. Apophyses anteriores very short, much shorter than apophyses posteriores. Some wrinkles present around ostium, but only weakly sclerotized. Ductus bursae very short, with lightly sclerotized antrum forming an incomplete collar. Corpus bursae very small and round; signum absent.

**Diagnosis:** Moths of *Mictoschema* are fairly plain on the underside, like those of *Aplasta*, *Holoterpna*, *Pseudoterpna* and *Mimandria*, but *Mictoschema* moths are more strongly mottled brown over the entire wing, compared with the others. These genera share characters of loss or reduction of the proboscis and/or the frenulum, but to varying degree, and the absence of both proboscis and frenulum distinguishes *Mictoschema* from *Mimandria* and *Pseudoterpna*. The male genitalia of *Mictoschema* are distinguished from those of most of the above genera in having the valvae almost simple, not divided as in *Mimandria*, or with a spinose harpe as in *Aplasta* and *Pseudoterpna*. The genitalia of *Mictoschema* are most similar to those of *Holoterpna*, except that the gnathos of the latter genus has a smaller, although stronger, median region that is tongue-like and minutely spinulose. [See also the discussion under *Aplasta*.]

**Distribution:** Afrotropical Region: Botswana; Namibia; South Africa; Zimbabwe.

**Species included**
- *swierstrai* Prout, 1922a (*Mictoschema*) [male and female genitalia]
tuckeri Prout, 1925 (Mictoschema) [male genitalia]

**Mimandria Warren, 1895** (Figs 23, 70, 108, 144)

Mimandria Warren, 1895: 88. Type species: Mimandria insularis Swinhoe, 1904. [Cited in Pseudoterpnini by Hausmann, 1996a.]

**Adults** (Fig. 23): Moths small (compare scale of Fig. 23 with Figs 13, 14 of Herochroma). Antenna bipectinate usually almost to apex, in both sexes but sometimes with extremely short rami in female. Frons sometimes protruding slightly, black or dark brown and smooth scaled. Proboscs reduced. Labial palpus with third segment short in male, longer in female.

Wing pattern: straw-coloured, or greyish green or brown, mottled; fore wing with wavy antemedial line, postmedial line dentate and curved, submarginal line white but often indistinct and near postmedial line; row of small reddish brown spots with white edges outside postmedial line and mingling with submarginal line; discal spot present on fore and hind wings, often small or indistinct but moderate sized, on fore wing sometimes as a dash. Underside: mainly paler and plainer than upper side, postmedial line occasionally distinct but usually faint or absent, without row of spots; with or without darker but fairly weak, diffuse, and broken outer band; discal spots varying from fairly distinct to extremely faint. Outer margin of wings very slightly wavy or almost smooth; hind wing rounded, with costa of moderate length and anal margin fairly elongate.

Hind tibia usually without hair-pencil. Abdomen usually with low dorsal crests, often with a dark mark on either side of each; sternite 3 without setal patches.

**Male genitalia** (Figs 70, 108): Genitalia not heavily sclerotized. Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal half to two-thirds fused, prongs slender, tapered and very close together. Gnathos arms, but not median projection, fused with membrane of diaphragma; median region expanded and flat, with tiny pimple-like ridges. Valva divided into long costal lobe, finger-like or tapered, and much shorter sacculus, rounded and with a distal row or group of spines; sacculus either rigidly folded over costal lobe of valva and fused basally with diaphragma (*insularis*), or diverging from costal lobe and not fused basally (*catactae*); costal margin of valva slightly curved convexly. Coremata absent. Transtilla arms joined as a weakly sclerotized loop, projecting strongly posteriorly, and forming a pair of pouches anteriorly. Saccus projecting distinctly or sometimes only slightly. Aedeagus with posterior sclerotized tongue-like extension; vesica with one or more caeca, and with a patch of cornuti (spines, or wrinkled and somewhat sclerotized region with minute pimple-like spinules.

**Female genitalia** (Fig. 144): Apophyses anteriores very short, much shorter than apophyses posteriores. Wrinkled region present around ostium (with lamella postvaginalis but not strongly defined), mainly membranous or sometimes partly sclerotized. Ductus bursae very short, with or without antrum lightly sclerotized and forming an incomplete collar. Corpus bursae fairly small or elongate, membranous; signum absent.

**Diagnosis:** Mimandria closely resembles Epipristis, and to some extent Herochroma (a genus of usually larger moths), in the wing pattern, having a lacy band of whitish-edged spots between the postmedial and submarginal lines. [N.B. Mimandria occurs only in the Afrotropical Region, and Epipristis and Herochroma do not occur there.] The underside of Mimandria is plainer though, and the proboscs is reduced, features in common with Aplasta, Holoterpna, Mictoschema and (with plain underside but proboscs not reduced) Pseudoterpna, none of which has a band of lacy markings on the upper side of the wings. [See also the discussion under Aplasta.] The male genitalia of Mimandria are distinguished from those of the above genera (except some species of Herochroma) in having the valva divided, and from Herochroma in having the soci very close together, not diverging. Mimandria and the flavibalis-group of Herochroma are unusual in having the gnathos arms fused with the diaphragma, but not also the median projection of the gnathos as in Crypsiphona and Paraterpna.

**Distribution:** Afrotropical Region: Angola; Kenya; Madagascar; Mauritius; Namibia; Réunion; South Africa; Zimbabwe.

**Species included**
cataractae cataractae Prout, 1917b (Mimandria) [male and female genitalia]
cataractae rhusiodocha Prout, 1934a (Mimandria) diospyrata (Boisduval, 1833) (Geometra)
insularis Swinhoe, 1904 (Mimandria) [male and female genitalia]
kelty Viette, 1971 (Mimandria) recognita (Saalmüller, 1891) (Hypochroma)

**Orthorisma Prout, 1912B**
(Figs 24, 48, 71, 109, 145)

Orthorisma Prout, 1912b: 181. Type species: Hypochroma netunaria Guenée, [1858]. [Replacement name.][Cited in Pseudoterpnini by Holloway, 1996.]
Orthocraspeda Prout, 1912a: 11 (key), 28. Type species: Hypochroma netunaria Guenée, [1858]. [Junior
Adults (Figs 24, 48): Antenna simple filiform in both sexes but thick in male. Frons protruding slightly to moderately, dark brown or black and smooth-scaled, but with a white or cream line at lower edge and a band between the antennae. Labial palpus not rough-scaled; with third segment fairly elongate in female, shorter but not very short in male.

Wing pattern: ranging from pale brown to olive-green, with dark brown or black speckles and other markings; antemedial line wavy; postmedial line wavy or dentate, well defined, distinctly angled at vein M₃ and concave above angle, without whitish shading but with dark speckles forming a diffuse band on outer side (at least towards costa), these speckles sometimes forming a broken submarginal line; discal spot forming a comma-like dash or sometimes broken into two spots on the fore wing, and an indistinct dash or dot on the hind wing. Underside: fore and hind wings with basal zone (to postmedial line) whitish or cream; outer zone with dark brown band, shading paler to outer margin of fore wing, and with more distinct pale area at margin of hind wing; discal spot black-brown, a dash (usually moderate-sized) on the fore wing, a very faint dash or dot on the hind wing. Outer margin of wings slightly wavy to almost smooth; hind wing rounded, with costa fairly short and anal margin slightly to moderately elongate.

Hind tibia of male with hair-pencil. Abdomen with dorsal crests. Sternite 3 of abdomen without setal patches; segment 8 of male with sclerotized processes at posterior end: large processes on tergite, smaller medial process on sternite.

Male genitalia (Figs 71, 109): Uncus large, broader than long and bilobed; socii sclerotized but not strongly developed. Gnathos with large, strongly bilobed, median process, minutely spinulose in part. Valva moderately long and narrow, simple, not divided, and without processes other than some low basal ridges and furrows. Coremata long. Transtilla a lightly sclerotized band produced as a pair of pouch-like projections anteriorly. Saccus protruding, squarish or slightly rounded. Aedeagus slender, without a posterior projection; vesica with cornuti, a large region of tiny spinules.

Female genitalia (Fig. 145): Apophyses anteriores absent. Sternite 8 forming medial pair of setose sclerotized lobes, well posterior to very broad complex region present around ostium; the latter region with sclerotized ridges and lobes, including a pair of setose lobes flanking ostium. Ductus bursae long and slender, with ridges and wrinkles. Corpus bursae membranous and fairly slender; signum absent.

Diagnosis: Moths of Orthorisma can be recognized by their distinctive postmedial line on the fore wing: well defined, angled and concave above the angle. More distinctive characters are the broad bilobed uncus of the male genitalia, and the large processes on the male abdominal tergite 8.

Distribution: Oriental Region: Brunei; Malaysia (Sabah, Sarawak); Indonesia (Kalimantan, Natuna Islands, Sumatra, 1996).

Species included netunaria (Guenée, [1858]) (Hypochroma) [male and female genitalia] crassistriga (Warren 1896d) (Terpna) unicolor (Warren 1899a) (Actenochroma)

PACHISTA PROUT, 1912A (Figs 25, 72, 110, 146)

Pachista Prout, 1912a: 40. Type species: Hypochroma superans Butler, 1878, Han, Li & Xue (2006). [Historical treatment of Pachista as a subgenus of Terpna, by Prout (1912a, 1927) indicates its inclusion, here confirmed, in Pseudoterpnini (of which Terpmini is a synonym).]

Adults (Fig. 25): Moths: male moderately large but female larger. Antenna bipectinate in both sexes, rami shorter in female than in male. Frons protruding strongly. Labial palpus with third segment barely elongate in female.

Wing pattern: grey-brown with fine dark striations; fore wing with black sub-basal line, wavy antemedial line and postmedial line black towards costa, where each forms a black spot, but lines mostly fainter elsewhere on wings, postmedial line with white shading on outer side, postmedial line dentate, angled on fore wing, submarginal line white, dentate but not very distinct; discal spot forming a long black dash. Underside: wings with large basal zone (to postmedial line) mainly whitish but with dull yellow spreading diffusely from base; outer zone with a dark brown band, wavy at inner margin (i.e. at postmedial line); wings with large blackish discal spot, and with a smaller blackish spot basal from discal spot and a blackish streak below basal spot. Outer margin of wings slightly wavy; hind wing with costa short and anal margin elongate.

Hind tibia without hair-pencil. Abdomen with dorsal crests usually prominent; sternite 3 without setal patches.

Male genitalia (Figs 72, 110): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal two-thirds fused, prongs close together, almost straight. Gnathos with median process tongue-like, spinulose. Valva broad and well sclerotized, slightly

homonym of Orthocraspeda Hampson, [1893] 1892 (Lepidoptera: Limacodidae).]
divided for a short length distally, with median ridge between costal lobe and sacculus forming a large rounded sclerite; costal apex curved outwards, sacculus with irregularly denticate apex, and with rugose-edged setose median area. Coremata small and weak. Transtilla weakly developed. Saccus protruding and rounded. Aedeagus long and with posterior part broader, well-sclerotized and with a large area of spinules, vesica with a large wrinkled plate-like cornutus.

Female genitalia (Fig. 146): Ovispositor valves strongly papillate and setose. Apophyses anteriore absent. Very broad, wrinkled and sclerotized, region present around ostium. Ductus bursae very short and narrow; without distinct antrum. Corpus bursae large and broad, membranous; signum absent.

Diagnosis: Pachista is one of only a few genera in the Pseudoterpnini with the antennae bipectinate in the female [the others are Limbatochlamys, Lophothorax, Mimandria, Holoterpn (sometimes), and Lophophilma and Psilotagma (one species each)], whereas in other genera they are usually simple filiform. Pachista is distinctive in having two dark markings, in addition to the large discal spot and outer band, on the underside of both fore and hind wings. That character is shared with a few members of Metallolophia, but Metallolophia can usually be distinguished by pale-centred discal spots on the upper surface of the wings. A unique character is present in the valva of the male genitalia: the large rounded sclerite formed from the ridge between the costal lobe and the sacculus.

Biological notes: Host plants: Magnoliaceae: Magnolia spp. (Sugi, 1987: 271) and Hippocastanaceae: Aesculus (Inoue, 1961: 90). The larva is white-winged green, fairly short, stout, but sometimes appearing slightly flattened along the lateral ridge (a white line), and with a projecting pointed head; it is figured, in a rigid resting posture, by Sugi (1987: pl. 14, fig. 1), and http://aoki2.si.gunmau.ac.jp/youtyuu/HTMLs/ooayashaku.html.

Distribution: Palaearctic Region: China; Japan; Korea (Shin, 1996).

Species included

superans (Butler, 1878) (Hypochromia) [male and female genitalia]
shirakiana (Matsumura, 1931) (Pingasa)

PACHYODES GUENÉE, [1858]
(Figs 26, 27, 73, 111, 147)


Adults (Figs 26, 27): Moths large (compare scale of Figs 26, 27 with Figs 13, 14 of Herochroma). Antenna bipectinate in male, simple filiform in female. Frons protruding strongly, with distinct broad black transverse median band complete or occasionally broken. Labial palpus short, sometimes third segment slightly elongate in female.

Wing pattern: usually dull white, diffused with grey-green; fore wing with costa diffused with longitudinal, purple-red tinged, brown striations, extending downwards in the region between antemedial line and discal spot, then tapering off gradually; apex with purple-red tinged brown patch, occasionally with similarly coloured patch extending from base of hind wing to discal spot. Antemedial line not strongly wavy, postmedial line (angled or curved, white with black dots at veins) and submarginal line (white) wavy or dentate; fore wing with sub-basal line in addition to other lines. Hind wing with longitudinal purple-brown or black bar near outer margin, between veins CuA1 and CuA2, at border of grey-green patch at anal angle. underside: wing base strong yellow; fore and hind wings usually with large black discal spot; area between yellow base and discal spot usually with brown or blackish markings (except in pratti); outer zone of wings (outside postmedial line) occasionally a blackish band but usually composed of separate spots. [A few species (amplificata and leucomelanaria) with somewhat different wing pattern: wings (above) dull white diffused with grey-brown striations and blotches; outer margin of wings diffused with strong yellow, particularly at anal angle of hind wing.] Outer margin of fore wing barely wavy, hind wing margin not much rounded, sometimes oblique; hind wing with costa not particularly short but with anal margin elongate.

Hind tibia of male sometimes with hair-pencil and terminal tuft. Abdomen with well-developed dorsal crests. Sternite 3 of male abdomen with a pair of setal patches [character not visible in the damaged abdomen examined of pratti].

Male genitalia (Figs 73, 111): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal two-thirds fused, prongs very close together, straight and forming a tiny point at apex. Gnathos with narrow median process, pointed tongue- or V-shaped, spinulose. Valva well sclerotized, well divided into two large lobes (costal lobe and sacculus), of similar length or the costal lobe a little shorter, not very
narrow, without distal processes (merely with a series of tiny teeth around the margin of the sacculus); costal lobe with blunt or rounded apex and with a low process or ridge across lower half, irregularly wrinkled; sacculus broader, with rounded apex. Coremata well developed. Transtilla with pair of arms not joined, bulbous and weakly sclerotized. Saccus protruding distinctly, with rounded apex. Aedeagus short and posteriorly broad; more sclerotized posteriorly and with large area of spinules; vesica without cornuti.

**Female genitalia** (Fig. 147): Apophyses anteriores extremely short, much shorter than apophyses posteriores. Very broad, wrinkled and sclerotized, region present around ostium; lamella postvaginalis often rounded, occasionally weakly defined. Ductus bursae moderately to very short; without distinct antrum. Corpus bursae large, broad or elongate, membranous; signum absent.

**Diagnosis:** Moths of *Pachyodes* are usually easily recognized by the longitudinal reddish-brown striations on the fore wing (but not on the hind wing), and often also by the longitudinal bar between CuA1 and CuA2 on the hind wing. The valva of the male genitalia is characteristic throughout the genus in being well divided into two large lobes of similar length, or the costal lobe a little shorter, and which are neither very narrow nor have distal processes.

**Distribution:** Palaearctic Region: China; Oriental Region: Brunei; China; India; Indonesia (Kalimantan, Sumatra); Malaysia (Peninsular, Sarawak); Nepal; Philippines; Thailand; Vietnam.

**Species included**
- *amplificata* (Walker, 1862) (*Abraxas*) [male and female genitalia]
- *abraxas* (Oberthür, 1913) (*Hypochroma*)
- *haemataria* (Herrich-Schäffer, [1854]) (*Terpna*) [male and female genitalia]
- *almaria* Guenée, [1858] (*Pachyodes*)
- *leucomalanaria* Poujade, 1895 (*Pachyodes*)
- *ornataria* Moore, 1888 (*Pachyodes*) [placed in *Pachyodes* in Scoble (1999)] [male genitalia]
- *pratti* (Prout, 1927) (*Terpna*) [male genitalia]
- *subtrita subtrita* (Prout, 1914) (*Terpna*) [male genitalia]
- *subtrita simplicior* (Joannis, 1929) (*Terpna*)

**Paraterpna Goldfinch, 1929**
(Figs 28, 49, 74, 112, 148)

**Paraterpna** Goldfinch, 1929: 401. Type species: *Paraterpna harrisoni* Goldfinch, 1929. [Here assigned to Pseudoterpnini.]

**Adults** (Figs 28, 49): Antenna of male bipectinate in basal three-quarters or more, with short rami; simple filiform in female. Frons not protruding significantly but densely scaled, frons with a median transverse band that is dark greyish brown, whitish below and white above. Labial palpus with third segment fairly short in male, slightly longer in female.

Wing pattern: white mottled with grey and brown, with grey-brown lines on veins, distinct on fore wing and fainter or incomplete on hind wing; antemedial and postmedial lines strongly dentate; postmedial line distinct and strongly sinuous on fore wing, but weak on hind wing; whitish submarginal line on fore and hind wings broken and indistinct. Hind wing with pale basal zone and diffusely darker outer zone; discal spot indistinct on fore wing but present as a faint grey or brown line in pale basal zone on hind wing. Underside: wings with very large whitish or pale greyish brown zone, with blackish brown band or blotch in outer zone (large band strongly contrasting on hind wing, smaller blotch on fore wing); dark discal spot present as a dash on fore and hind wings. Outer margin of wings wavy, particularly hind wing; fore wing elongate; hind wing with costa and anal margin fairly long.

Thorax and tegulae with dense covering of long hair-like scales dorsally. Hind tibia of male with hair pencil. Abdomen with black dorsal markings in a longitudinal line; sternite 3 of male with a pair of widely spaced setal patches; segment 8 of male with a truncate sclerotized lobe at posterior end of tergite.

**Male genitalia** (Figs 74, 112): Uncus vestigial. Soci very strongly developed, large and sclerotized, densely setose, pressed together from sub-basally to near mid-length, apical halves tapered and pointed, diverging and slightly curved outwards. Gnathos a long U-shape, entirely fused with membrane of diaphragma and with posterior end of transtilla. Valva divided from near base, forming three moderately to extremely long and narrow lobes; costal lobes asymmetrical. Coremata absent. Transtilla arched posteriorly and with a pair of pouches. Juxta with V-shaped postero-ventral margin. Saccus protruding distinctly. Aedeagus moderately broad, with a few posterior ridges, and with a large posterior spine pointing slightly towards anterior end.

**Female genitalia** (Fig. 148). Ovipositor valves strongly papillate and setose. Apophyses anteriores very short, much shorter than apophyses posteriores. Antrum moderately sclerotized and smooth, large and very broad, with ostial opening approximately as broad as sternite 8. Sternite 7 with medio-posterior field of spine-like setae. Corpus bursae pear-shaped and membranous; signum present as a small, minutely spinulose, patch.

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**Diagnosis:** The general greyish colour of the moths, with dark streaks mainly along the veins, is characteristic and only likely to cause confusion with the very similar *Cyneoterpna*. The male genitalia differ distinctly: in *Paraterpna* the gnathos is well developed and the valva is composed of three lobes, whereas in *Cyneoterpna* the gnathos is absent and the valva is composed of two lobes with a ridge between them. *Paraterpna* shares some highly unusual characters with another genus, *Crypsiphona*, (although the external features of the moths differ – compare Fig. 28 of *Paraterpna* with Figs 5, 6 of *Crypsiphona*): both genera have the gnathos entirely fused with the membrane of the diaphragma. [Mimandria and the flavibasalis-group of Herochroma also have the gnathos arms fused with the membrane of the diaphragma, but not the median projection of the gnathos.] *Paraterpna* and *Crypsiphona* have similar socii also, which are pressed together sub-basally but not fused, and then flare outwards in the apical half (bifid in *Crypsiphona* but not in *Paraterpna*), while the uncus base is vestigial or entirely absent. In the female genitalia *Paraterpna* has a distinctively large broad antrum, and the genus is one of a minority of Pseudoterpnini that have a signum in the female.

**Biological notes:** Host plant(s): Myrtaceae: *Leptospermum* (McFarland, 1988: 228).

**Distribution:** Australasian Region: Australia (New South Wales).

**Species included**

*harrisoni* Goldfinch, 1929 (*Paraterpna*) [male and female genitalia]

**PINGASA MOORE, [1887]  
(FIGS 29, 75, 76, 113, 149)**

*Pingasa* Moore, [1887] 1884–7: 419. Type species: *Hypochroma ruginaria* Guenée, [1858]. [In Terpnini sensu Inoue, 1961 (= Pseudoterpnini).]

*Skorpistes* Lucas, 1900: 143. Type species: *Skorpistes undascripta* Lucas, 1900 (junior synonym of *Pingasa cinerea* Warren). [Synonymized by Prout, 1912a: 30.]

**Adults** (Fig. 29): Antenna bipectinate with short rami in male (proximal rami a little shorter than outer rami), simple filiform in female. Frons protruding moderately, with broad or narrow black transverse band varying (usually distinct but occasionally diffuse or absent, commonly in upper half of frons, but sometimes median or occasionally spread over all except upper margin of frons); frons usually smooth-scaled, seldom rough. Labial palpus with third segment smooth, often moderate in length in male but occasionally tiny, elongate in female.

Wing pattern: fore wing with distinct wavy or dentate antemedial line; fore and hind wings with post-medial line usually curved or sometimes angled, irregularly dentate, or smooth but with spikes extended along veins, and with distinct or indistinct, dentate or wavy, pale submarginal line. Postmedial line divides fore and hind wings into two zones: basal zone usually pale, from white to grey-brown, and outer zone usually darker, varying from pale or dark grey, or grey-green, to pinkish or reddish brown; in those species that have outer zone much darker than basal zone, white or pale patches are usually present at middle of outer wing margin; occasionally area from antemedial line to base of fore wing similar in colour to outer zone. Underside: fore and hind wings with basal zone white, except often yellow near base of wing, seldom diffused with grey-brown; fore wing usually with discal spot distinct and often forming a dash, and hind wing with or without discal spot; outer zone various, usually with distinct band, dark brown or purplish, commonly broad but sometimes narrow or broken (especially on hind wing), or occasionally without band. Outer margin of wings slightly to moderately wavy; hind wing with costa short and anal margin elongate. Hind wing with hair brushes: one situated on the basal edge of the discal spot, and the other between the lower margin of the cell and the hind margin (hair brushes absent in *lahayei* and *multispurcata*).

Hind tibia of male with short terminal extension in most species, and with hair-pencil. Abdomen with medium-sized or small dorsal crests. Sternite 3 of male abdomen usually with a pair of setal patches, sometimes joined together by sparse setae in the middle.

**Male genitalia** (Figs 75, 76, 113): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal half to four-fifths (approximately) fused; prongs straight and very close together. Gnathos with pair of narrow median processes, or median region expanded (occasionally very broad) and slightly to moderately bilobed, spinulose. Valvae extremely variable in shape and sometimes asymmetrical; often divided distally into costal lobe and sacculus, with sacculus approaching or often extending beyond apex of costal lobe, but valva undivided in a few species; a few species with a spinose lobe ventrally near base, or with other process. Coremata well developed or weak. Transtilla usually weakly developed but occasionally with pair of arms projecting strongly posteriorly. Anellus sometimes forming posterior plate, rarely strongly sclerotized. Juxta slightly to well sclerotized, and often with separate or weakly-joined sclerotized
process situated posteriorly to it; this posterior process long and often spinulose. Saccus often not projecting distinctly but sometimes projecting and rounded. Aedeagus moderately short, sometimes with a sclerotized process (usually finger-like, arising medially and lying along the aedeagus, but occasionally a more distal tooth-like process); vesica usually with cornutus, often a strong spine or blade, but sometimes shaped otherwise or occasionally absent.

**Female genitalia** (Fig. 149): Apophyses anteriores short, often extremely so, and much shorter than apophyses posteroiores. Moderately to very broad, slightly wrinkled, sclerotized region present around ostium, sometimes merging with lamella postvaginalis, which is usually weakly defined. Ductus bursae narrow or broad, usually short but occasionally long and membranous; without distinct antrum but entire ductus bursae often lightly to well sclerotized. Corpus bursae moderately large or occasionally small, membranous; without distinct antrum but entire ductus bursae often lightly to well sclerotized. Corpus bursae moderately large or occasionally small, membranous or sometimes sclerotized at posterior end, signum absent.

**Diagnosis:** Those species that have a well-marked dark outer band on the wings are easily recognized as *Pingasa*, but the presence of a pair of hair brushes on each hind wing is a more definitive character for the genus. *Sundadoxa* has a single hair brush and *Hypochna* usually has three or one, but in both those genera the hair brush is situated more basally (in relation to the discal spot) than in *Pingasa*. The male genitalia of *Pingasa* are variable, but the pair of narrow median processes on the gnathos of many species is distinctive, and, when present, the posterior process of the juxta is too.


Anacardiaceae: Anacardium, Buchanania, Euroschninus, Rhus, Schinus, Sclerocarya
Aquifoliaceae: Ilex
Apocinaceae: Carissa
Araliaceae: Cussonia
Combretaceae: Terminalia
Compositae: Gerbera
Dipterocarpaceae: Shorea
Ericaceae: Erica
Hammamelidaceae: Liquidambar
Lauraceae: Cinnamomum, Litsea,
Leguminosae: Cajanus, Crotalaria, Dalbergia, Lespedeza, Xydia
Myrsinaceae: Maesa

Myrtaceae: Eugenia, Psidium, Rhodomyrtus
Pinaceae: Pinus
Rhamnaceae: Ziziphus
Rubiaceae: Mussaenda, Wendlandia
Rutaceae: Flindersia
Sapindaceae: Dimocarpus, Lepisanthes, Litchi, Nepheleum
Sterculiaceae: Sterculia, Triplochiton
Ulmaceae: Trema

The unusual resting position of *Pingasa* moths is referred to on p. 360.

**Distribution:** Palaearctic Region: Algeria; China; Iran; Iraq (Hausmann, 1996b); Japan; Morocco; Turkmenistan; Afrotropical Region: Burundi; Cameroon; Comoros; Côte d’Ivoire; Ethiopia; Equatorial Guinea; Ghana; Kenya; Libya; Madagascar; Malawi; Mauritius; Nigeria (Hausmann, 1996a); Réunion; Rwanda; São Tomé & Príncipe; Saudi Arabia; Sierra Leone; South Africa; Tanzania; The Gambia; Uganda; Zaire; Zimbabwe; Oriental Region: Bhutan; Brunei; Cambodia; China; India (including Andaman Islands); Indonesia (Bali, Java, Kalimantan, Lombok, Mentawai Archipelago, Sulawesi, Sumatra, Sumbawa); Malaysia; Nepal; Philippines; Sabah; Sri Lanka; Taiwan; Thailand; Vietnam; Australasian Region: Australia; Indonesia (Irian Jaya, Moluccas); Papua New Guinea; Solomon Island.

**Species included**

abyssinaria abyssinaria (Guenée, [1858]) (Hypochroma)
abyssinaria rafata Fletcher, 1956 (*Pingasa*) [male and female genitalia]
aigneri aigneri Prout, 1930b (*Pingasa*) [male genitalia photograph, Yazaki (1995: fig. 572)]
aigneri pallida Yazaki, 1995 (*Pingasa*) [male genitalia photograph, Yazaki (1995: fig. 573)]
*alba alba* Swinhoe, 1891 (*Pingasa*)
*alba albida* (Oberthür, 1913) (Hypochroma)
alba brunescens Prout, 1913 (*Pingasa*) [male genitalia]
anguifera Warren, 1896b (*Pingasa*)
atriscrpta Warren, 1899a (*Pingasa*)
munita (Lucas, 1901) (Hypochroma)
aravensis Prout, 1916a (*Pingasa*)
atropa Prout, 1935b (*Pingasa*)
blanda (Pagenstecher, 1900) (Pseudoterpnia)
acutangula Warren, 1903 (*Pingasa*)
chiora chlora (Stoll, 1782) (Phal[aena] Pyralis) [male genitalia]
chloraria (Guenée, [1858]) (Hypochroma)
cechioraria (Hübner, [1823]) (Pseudoterpnia)
latifascia Warren, 1894a (*Pingasa*)
*Paulinaria* (Pagenstecher, 1885) (Hypochroma)
chlorota candidaria Warren, 1894a (Pingasa) [male genitalia]
chlorota subdentata Warren, 1894a (Pingasa) [male genitalia]
chlorota sublimbata (Butler, 1882) (Hypochroma) [male genitalia]
chloroides Galsworthy, 1998 (Pingasa) [male and female genitalia]
cinerea Warren, 1894a (Pingasa)
singularis (Kershaw, 1897) (Pseudoterpna)
undescripta (Lucas, 1900) (Skorpistes)
cornivalva Wiltshire, 1982 (Pingasa)
crenaria (Guèneé, [1858]) (Hypochroma) [male genitalia]
distenta (Walker, 1860) (Hypochroma)
leucostigmaria (Nietner, 1861) (Boarmia)
decristata Warren, 1902b (Pingasa)
dispensata dispensata (Walker, 1860) (Hypochoma)
dispensata celata (Walker, 1866) (Hypochroma)
dispensata delotypa Prout, 1935c (Pingasa)
distensaria distensaria (Walker, 1860) (Hypochroma)?
distensaria respondens (Walker, 1860) (Hypochroma) [male and female genitalia]
elutriata Prout, 1916b (Pingasa)
floridivenis Prout, 1920 (Pingasa)
grandidieri (Butler, 1879) (Hypochroma)
eugrapharia (Mabille, 1880) (Hypochroma)
grieveaudi grrieveaudi Herbulot, 1966 (Pingasa)
grieveaudi vinoso Herbulot, 1985 (Pingasa)
herboloti Viette, 1971 (Pingasa)
hypoleucaria hypoleucaria (Guèneé, 1862) (Hypochroma)
borbonisaria (Oberthür, 1913) (Hypochroma)
hypoleucaria rhodozona Joannis, 1932 (Pingasa)
hypoxyantha hypoxyantha Prout, 1916c (Pingasa)
hypoxyantha holochroa Prout, 1916c (Pingasa)
javensis Warren, 1894a (Pingasa) [male genitalia]
chlora lobombokensis Prout, 1927 (Pingasa)
lahayeai lahayeai (Oberthür, 1887) (Hypochroma)
lahayeai austrina Prout, 1917b (Pingasa) [male genitalia]
lariaria (Walker, 1860) (Hypochroma) [male genitalia]
irrutararia (Moore, 1868) (Hypochroma)
manilensis Prout, 1916b (Pingasa) [male genitalia]
meeki Warren, 1907 (Pingasa)
multispurca Prout, 1913 (Pingasa)
murphyi Herbulot, 1994 (Pingasa)
nobilis nobilis Prout, 1913 (Pingasa)
nobilis furfurons Prout, 1927 (Pingasa)
pallidata Joannis, 1913 (Hypochroma)
pauciflavata Prout, 1927 (Pingasa)
porphyrochrostes Prout, 1922b (Pingasa) [male genitalia]
pseudoterpnaia pseudoterpnaia (Guèneé, [1858]) (Hypochroma) [male and female genitalia]
pryeri (Bulter, 1878) (Hypochroma)
pseudoterpnaia gracilis Prout, 1916a (Pingasa) [male genitalia]
pseudoterpnaia tephrosiaria (Guèneé, [1858]) (Hypochroma)
rhadamaria rhadamaria (Guèneé, [1858]) (Hypochroma)
rhadamaria alterata (Walker, 1860) (Hypochroma)
rhadamaria attenuata (Walker, 1860) (Hypochroma)
rhadamaria signifrontaria (Mabille, 1893) (Hypochroma)
rhadamaria victoria Prout, 1913 (Pingasa)
rubiconda Warren, 1894a (Pingasa) [male genitalia]
rubimontana Holloway & Sommerer, 1984 (Pingasa) [male genitalia]
rufofasciata Moore, 1888 (Pingasa) [male and female genitalia]
ruginaria ruginaria (Guèneé, [1858]) (Hypochroma) [male and female genitalia]
nyctemerata (Walker, 1860) (Hypochroma)
perfectaria (Walker, 1860) (Hypochroma)
ruginaria andamanica Prout, 1916b (Pingasa)
ruginaria communicans (Walker, 1860) (Hypochroma) [male genitalia] [appears to be not conspecific with ruginaria ruginaria but this needs to be confirmed]
ruginaria commutata (Walker, 1860) (Hypochroma)
battariaria (Plötz, 1880) (Hypochroma)
ruginaria interrupta Warren, 1901 (Pingasa)
ruginaria pacifica Inoue, 1964 (Pingasa) [male and female genitalia]
secretata Inoue, 1986 (Pingasa) [male and female genitalia photographs, Inoue (1986, figs 4, 5)]
subpurpurea Warren, 1897a (Pingasa) [male genitalia]
subviridis Warren, 1896c (Pingasa) [male and female genitalia]
tapungkanana (Strand, 1910) (Pseudoterpna) [male genitalia]
ultrata Herbulot, 1966 (Pingasa)
venusta Warren, 1894a (Pingasa) [male genitalia]

Pseudoterpna Hübner, [1823] 1816
(Figs 30, 77, 114, 150)
Pseudoterpna Hübner, [1823] 1816: 285. Type species: Geometra cythisaria [Denis & Schiffermüller], 1775 [junior synonym of Pseudoterpna pruinata (Hufnagel)].

Adults (Fig. 30): Antenna bipectinate with short rami in male, simple filiform in female. Frons protruding slightly to moderately, with rough scales. Labial palpus with third segment short in both sexes.

Wing pattern: grey-brown, or pale to moderately dark grey-green. Antemedia and postmedial lines brown or dark green, antemedial line dentate or
wavy; postmedial line (on upper side and underside) dentate and on fore wing slightly angled or occasionally straight, distinct or, particularly on underside, faint; submarginal line white, dentate or slightly wavy; discal spot brown or dark green, forming a narrow dash on both upper side and underside of fore wing, sometimes faint or on hind wing even absent. Underside rather plain, without strong markings; grey-brown or greenish, often slightly paler than upper side. [One species, simplex, without any lines or other markings on upper side and underside]. Outer margin of wings slightly wavy or smooth; hind wing with costa fairly long, apex often protruding beyond anal angle of fore wing. Frenulum slightly to wing with aedeagus developed. Transtilla with large lightly-sclerotized patch of setae. Coremata small or moderately well developed. Hind tibia of male often with hair-pencil, occasionally with terminal tuft. Abdomen usually with weakly to moderately developed dorsal crests, occasionally without; sternite 3 of male with or without a pair of setal patches.

Male genitalia (Figs 77, 114). Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal half to two-thirds fused, prongs tapered and usually narrow, very close together or somewhat diverging apically, almost straight. Gnathos with median region expanded, spinulose [sometimes with long terminal spines (Hausmann, 2001)], and slightly indented at apex. Valva not divided, narrow to moderate in width, with smooth outline and rounded apex; with median ridge or lobe (harpe) usually large, often longer than broad, spinose, or with one spine and a patch of setae. Coremata small or moderately well developed. Transtilla with large lightly-sclerotized posterior projection. Saccus projecting distinctly, large and rounded or occasionally subrectangular. Aedeagus with narrow elongate sclerotized area, often with small dentate process near middle, and occasionally another at posterior end; vesica sometimes with fine, not dense, wrinkles.

Female genitalia (Fig. 150): Apophyses anteriores much shorter than aphyphoses posteriores. Very broad, wrinkled region present around ostium but only weakly sclerotized; with weakly-sclerotized and sometimes poorly defined, rounded lamella postvaginalis. Ductus bursae short to moderately long, moderately broad, sclerotized and wrinkled or ridged towards corpus bursae; with distinct, well-sclerotized, antrum extending to ostium. Corpus bursae small to fairly large, membranous; signum absent.

Diagnosis: Moths of Pseudoterpninae are not particularly distinctive, except that they are unusually plain on the underside of the wings compared with most other Pseudoterpninae. The genitalia have better definitive features. Males of Pseudoterpnae have a simple and undivided valva with a spinose or setose median ridge (harpe), which is similar to that of Epipristis, but the spines usually form a patch in Pseudoterpnae and never a line as is usual in Epipristis. The valvae of Pseudoterpnae also resemble those of Aplasta, except that the latter genus has a harpe on only one valva. Another feature in which Pseudoterpnae differs is that the vesica of the aedeagus does not have dense wrinkles as in Aplasta and Epipristis. [See also the discussion under Aplasta.]

Biological notes: Host plants: Leguminosae (Fabaceae): Adenocarpus, Calycotome, Chamaecytisus, Cytisus, Genista, Lygos (Retama), Spartium, Ulex [for this and other information on biology, including further reputed host plants, see Hausmann, 2001: 122–134; text-figs 105, 106 (egg of Pseudoterpa coronillaria flamignii)]. The larva (of P. pruinata) is strong green with a dark dorsal line, and with a conspicuous white to pink-tinged spiracular line along each side; the projection of the head is cleft. The resting posture of the larva is rigid and stick-like. For further accounts, and photographs of larvae, see Carter (1982: 118), Porter (1997: 26, pl. 9: C), Silvonen (website, 2002), and Thompson & Nelson (website, 2003).

Distribution: Palaearctic Region: Algeria; Austria; Belarus (Hausmann, 2001); Bosnia-Herzegovina; Bulgaria (Hausmann, 2001); Caucasus and Transcaucasus (Hausmann, 2001); Croatia; Cyprus; Denmark (Hausmann, 2001); France (including Corsica); Germany; Gibraltar; Great Britain (England); Greece (including Crete) (Hausmann, 2001); Hungary; Ireland; Israel; Italy [including Sardinia (Hausmann, 2001), and Sicily]; Jordan (Hausmann, 2001); Lebanon; Lithuania (Hausmann, 2001); Morocco; Portugal; Russia; Siberia (Hausmann, 2001); Slovakia; Spain; Sweden (Hausmann, 2001); Switzerland; Syria; Tunisia; Turkey; Ukraine (Hausmann, 2001). A record from China (Staudinger, 1901: 261) is unconfirmed.

Species included coronillaria coronillaria (Hübner, [1817]) (Geometra) [male genitalia line drawing, Hausmann (2001)] coronillaria algirica Wehrli, 1930 (Pseudoterpna) coronillaria axillaria Guenée, [1858] (Pseudoterpna) [male genitalia line drawing, Hausmann (1996a)] coronillaria cinerascens (Zeller, 1847) (Geometridae) [male genitalia line drawing, Hausmann (1996a)] coronillaria flamignii Hausmann, 1997 (Pseudoterpninae) [male and female genitalia line drawings, Hausmann (2001)]

© 2007 Natural History Museum, London
corinillaria halperini Hausmann, 1996a (Pseudoterpnina) [male genitalia line drawing, Hausmann, 1996a]  
corsicaria (Rambur, 1833) (Hemithea) [male and female genitalia line drawings, Hausmann (2001)]  
corsicaria ramburaria Oberthür, 1916 (Pseudoterpnina)  
lesuraria Lucas, 1933 (Pseudoterpnina) [male genitalia]  
pruinata (Hufnagel, 1767) (Phalaena) [male and female genitalia]  
agrestaria (Duponchel, 1829) (Hemithea) [cited as a synonym by Hausmann, 2001]  
atropunctaria (Walker, [1863]) (Aspiletes) [treated as a synonym by Hausmann, 2001]  
pruinata f. candidata Stauder, 1920 (Pseudoterpnina)  
cythisaria ([Denis & Schiffermüller], 1775) (Geométrata)  
genistaria (Villers, 1789) (Phalaena) (Geométrata) [synonymized by Hausmann, 2001]  
pruinata nigrolineata Schwingenschuss, 1918 (Pseudoterpnina)  
prasinaria (Fabricius, 1775) (Phalaena)  
pruinaria (Rottemburg, 1777) (Phalaena) [cited as an unjustified emendation by Hausmann, 2001]  
pruinaria var. virellata Krulikovski, 1908 (Pseudoterpnina) [synonymized by Hausmann, 2001]  
viridisparsata (Roqueta, 1857) (Phalaena) (Geométrata)  
rectistrigaria Wiltshire, 1948 (Pseudoterpnina) [male and female genitalia]  
simplex Alphéraky, 1892 (Pseudoterpnina)  

**Psilotagma Warren, 1894b**  
(Figs 31, 78, 115, 151)  

Psilotagma Warren, 1894b: 678. Type species: Psilotagma decorata Warren, 1894b. [Historical treatment of Psilotagma as a subgenus of Terpnina, by Prout (1912a, 1927) indicates its inclusion, here confirmed, in Pseudoterpnini (of which Terpnini is a synonym).]  

**Adults** (Fig. 31): Antenna in both sexes either simple filiform (decorata) or bipectinate but with very short rami (pictaria). Prods protruding moderately, with middle part blackish brown. Labial palpus with third segment short in both sexes.  

Wing pattern: Fore wing pale to mid brown or olive-brown, with distinct and strongly contrasting dark brown subapical patch at costa, and small, more diffuse, patches at and above anal angle, just outside postmedial line; antemedial line indistinct or sometimes almost absent, except for a dark brown patch on costa; postmedial line distinct between costa and vein M3, then strongly angled and continuing broken or indistinct, situated well towards submarginal line, which is white, dentate and usually indistinct. Hind wing with similar colour but paler, often whitish; postmedial line indistinct, with dark brown patches outside. Discal spot on both fore and hind wings narrow and bent. Underisde: fore and hind wing whitish; strong dark brown discal spots large and nearly round or crescent-shaped, with dark brown patches just outside indistinct postmedial line as on upper side. Fore wing slightly narrower than in other genera of Pseudoterpnini; outer margin of fore and hind wings slightly wavy; hind wing with costa moderate in length, and anal margin slightly elongate.  

Hind tibia of male with hair-pencil (decorata) or without (pictaria); often with short terminal extension. Abdomen with fairly well developed dorsal crests. Sternite 3 of male abdomen with (decorata) or without (pictaria) a pair of setal patches.  

**Male genitalia** (Figs 78, 115): Uncus well developed, long, slender and rod-like; socii lightly sclerotitized, slightly broader than uncus, short or long, but always shorter than uncus. Gnathos almost V-shaped, with median process spinulose. Valva moderately long, not divided into separate costal lobe and sacculus; costal and sacculus regions sclerotized; costa convexly curved, sometimes sinuous, with or without a tiny apical process; sacculus forming a long low ridge, sometimes folded over and with dentate margin. Coremata well developed or weak. Transtilla forming a pair of sclerotized arms, projecting posteriorly. Aedeagus with a pair of sclerotized processes arising medially, smooth or spinulose, rounded or pointed; vesica with or without spine-like cornutus.  

**Female genitalia** (Fig. 151): Apophyses anteriore shorter than apophyses posteriores. Surroundings of ostium sclerotized and minutely spinulose, particularly on a lateral pair of lobes, which are large and strongly developed in decorata, each lobe extending as a large and broadly rounded anterior pouch, but weakly developed in pictaria and limited to low lobes at opening of ostium, without an anterior pouch; lamella postvaginalis weakly defined and with some transverse wrinkles. Ductus bursae moderately long. Corpus bursae elongate, with bulbous anterior end particularly in pictaria, and curved and very large in decorata; narrow signum present in decorata, with several spine-like processes, but signum absent in pictaria.  

**Diagnosis:** The fore wing pattern of Psilotagma, with the strong dark subapical patch, is characteristic. That patch is usually larger than in Absala, the latter genus being clearly distinguished by having three very distinct large round spots on the white underside of the hind wing, compared with more broken and diffuse markings on the underside of Psilotagma. Psilotagma is one of a minority of genera in the Pseudoterpnini that have uncus and socii structure unmodified, i.e. the uncus is well developed and rod-like as in Lim-
batochlamys, but the valva, without a harpe and with the sacculus forming a long low ridge, is characteristic of Psilotagma. Psilotagma is also one of a minority of pseudoterpnine genera that have a signum in the female (in decorata only). The two species, decorata and pictaria, share characters of the moth (external) and of the male genitalia, but the female genitalia differ considerably – although both species have a lateral pair of spinulose lobes at the ostial opening, they are very different in degree of development.

Distribution: Palaearctic Region: China. Oriental Region: Bhutan; China; India; Nepal.

Species included

- decorata Warren, 1894b (Psilotagma) [male and female genitalia]
- dorsocristata (Poujade, 1895) (Terpna)
- pictaria Moore, 1888 (Pachyodes) comb. nov. [from ‘Pachyodes’] [male and female genitalia]

PULLICHROMA HOLLOWAY, 1996 (FIGS 32, 79, 116, 152)


Adults (Fig. 32): Antenna fasciculate in male, simple filiform in female. Frons protruding slightly. Labial palpus with first and second segments shorter than in Actenochroma; third segment short in male, moderately long in female.

Wing pattern: fairly uniformly straw-coloured with only a faint trace of olive-green; with well-defined dark brown costa; antemedial line wavy but often indistinct, postmedial line dentate, fine, and with whitish shading on outer side, postmedial line slightly curved on fore wing and sometimes slightly angled near costa; submarginal line faint and whitish; discal spot small. Underside: fore and hind wings with basal zone (to postmedial line) white or cream; outer zone with broad dark brown band; discal spot black-brown, small or moderate-sized, a dot or a very short dash, weaker or absent on the hind wing. Outer margin of wings no more than weakly wavy; hind wing slightly or distinctly rounded; hind wing with costa fairly short and anal margin slightly elongate.

Hind tibia without hair-pencil. Thorax and abdomen without dorsal crests. Sternite 3 of abdomen without setal patches.

Male genitalia (Figs 79, 116): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), but with socii apparently replacing uncus entirely, basal half fused but with the margins of the pair of prongs distinct, prongs diverging and curved outwards. Ga-

thos approximately quadrate, median region with pair of lobes far apart. Valva not divided; moderately narrow, with costal margin slightly convexly curved or almost straight; mainly only lightly sclerotized but with raised spinulose patch, situated ventrally at middle of lower margin of valva. Coremata long but very delicate. Transtilla lightly sclerotized, with pair of arms meeting. Saccus bilobed, with median indentation. Aedeagus with long slender process arising near base, i.e. anterior end (with spinulose apex in the sole member of the genus, pullicosta); vesica without cornuti.

Female genitalia (Fig. 152): Apophyses anteriores short, much shorter than apophyses posteriores. Broad, lightly sclerotized and concentrically wrinkled, region present around ostium, without differentiated lamella postvaginalis. Ductus bursae very long, with longitudinal weak ridges and covered with minute pimple-like spinules; antrum forming an incomplete collar. Corpus bursae membranous and very elongate, strongly bent towards posterior end; signum absent.

Diagnosis: Moths of Pullichroma are somewhat similar to those of Actenochroma in their fairly plain and pale colouring, but they are straw-coloured, not green as in Actenochroma. The male genitalia of Pullichroma and Actenochroma are not alike, and the soci structure of Pullichroma resembles that of Crypsiphona, replacing the uncus as a pair of prongs, although fused basally, not merely pressed together as in Crypsiphona, and not bifid apically as in Crypsiphona. Pullichroma has a character of the aedeagus unique in Pseudoterpnini, the long process arising from near the base, not medially as in some other genera, e.g. Dindica and Dindicodes.

Distribution: Oriental Region: Brunei; Indonesia (Sulawesi (Holloway, 1996), Sumatra); Philippines.

Species included

- pullicosta (Prout, 1931a) (Actenochroma) [male and female genitalia]

SUNDADOXA HOLLOWAY, 1996 (FIGS 33, 80, 117, 153)


Adults (Fig. 33): Antenna of male bipectinate in basal two-thirds, simple filiform in female. Frons protruding moderately, rough-scaled. Labial palpus all rough-scaled, third segment fairly elongate in both sexes.

Wing pattern: large areas of pale whitish grey or cream, with dark speckles and often suffused with
olive-green, and mid to dark brown or grey mottled patches; fore wing with pale basal zone (to postmedian line) and outer zone (from postmedian line outwards) usually darker; antemedia line dentate or indistinct; discal spot sometimes forming a small dash, on fore wing usually with a smaller spot on basal side towards costa; postmedian line wavy and curved, usually with whitish outer edge; white submarginal line wavy but sometimes indistinct. Underside: fore and hind wings with basal zone varying from whitish to mid brown or grey, but paler than dark outer zone, not speckled, outer margin whitish, particularly on hind wing towards anal angle; discal spot distinct and forming a dash. Outer margin of wings slightly wavy; hind wing rounded, with costa short and anal margin elongate, and with a conspicuous hair brush forming a dark, slanting, straight line, basal to the discal spot; raised scales near the base of the fore wing, if present at all, only weak, and only in males.

Hind tibia of male with hair pencil. Thorax and abdomen with dorsal crests weak or occasionally strong. Sternite 3 of male abdomen with a very weak pair of setal patches joined together.

Male genitalia (Figs 80, 117): Sclerotized bifid socii/uncus complex present (see p. 351 for discussion), with basal half fused, rod-like prongs strongly separated and curved outwards. Gnathos approximately quadrate, with broad median region very finely spinulose. Valva divided for a short length distally; costal lobe broad and rounded, with hook-like extension of the costal margin; sacculus a moderately broad, slightly spatulate, lobe, not extending as far as the costal lobe. Coremata very long and delicate. Transtilla only formed of arm bases, not joined; pair of patches of setae present in anellus. Saccus distinctly protruding, cruciform to diamond-shaped. Aedeagus broad, with short, smoothly sclerotized, anterior part; posterior part somewhat longer and lightly sclerotized, with longitudinal wrinkles and striations and with more rigid, folded spinulose region; vesica without cornuti.

Female genitalia (Fig. 153): Apophyses anteriores much shorter than apophyses posteriores. Very broad, finely wrinkled and lightly sclerotized, region present around ostium, with lateral patches of dense hairscales. Ductus bursae broad towards ostium, with sclerotized wrinkles and ridges, and with a region of extremely minute and inconspicuous pimple-like spinules. Corpus bursae membranous, slender and very elongate; signum absent.

Diagnosis: Moths of Sundadoxa, Hypodoxa and Pingasa all have hair brushes on the hind wings, but in Sundadoxa, unlike the other genera, the brushes form a single straight bar. These genera differ in characters of the male genitalia: for example the presence of coremata in Sundadoxa but not in Hypodoxa, and the former genus has a much smaller saccus than the latter. Sundadoxa does not have narrow median processes on the gnathos, as are present in Hypodoxa and often in Pingasa. The widely diverging rod-like prongs of the socii/uncus complex of Sundadoxa resemble those of Cyneoterpna, but Sundadoxa differs from that genus in having a fairly well-developed gnathos, a process on the costal margin of the valva, and coremata.

Distribution: Oriental Region: Brunei; Indonesia [Sumatra (Holloway, 1996)]; Malaysia (Peninsular, Sarawak).

Species included multidentata (Prout, 1916a) (Hypodoxa) [male and female genitalia]

The following genera have the uncus unmodified (i.e. moderately long and rod-like) and socii vestigial or absent (or fused with the anal tube and not strongly developed).

AEOLOCHROMA PROUT, 1912A
(Figs 34, 35, 50, 81, 118, 119, 154, 155)

Aeolochroma Prout, 1912a: 11 (key), 35. Type species: Hypochroma turneri Lucas, 1890. [Treated in Section A of Geometrinae by McFarland (1988); here assigned to Pseudoterpnini.]

Adults (Figs 34, 35, 50): Antenna in male bipectinate, fasciculate, or occasionally weakly ciliate; simple filiform in female. Frons protruding slightly to strongly, with dark transverse band, usually broad, in lower half or middle. Labial palpus often broad and short, third segment usually tiny in both sexes.

Wing pattern (sexually dimorphic in several species): overall pale to dark; varying mixtures of olive green (usually conspicuous), dark brown, and grey patches, with darker lines and other markings; occasionally mainly grey, brown or straw-coloured; fore wing sometimes with a broad, pale, diffuse band below costa, occasionally with white patches near costa or apex. Antemedia line wavy or dentate, postmedian line dentate and on fore wing irregularly curved, these lines dark and distinct, submarginal line also dark but commonly broken and sometimes indistinct. Fore wing and hind wings with discal spot, often a small, inconspicuous, dot or short dash, but sometimes moderately large and with pale centre bounded by a dark line. Underside (group 1: males and some females): fore and hind wings with basal zone (to postmedian line) dull yellow/orange, postmedian line varying from dark and distinct to extremely faint, with narrow white, or occasionally pale yellow, band on outer side of line; outer zone mainly dark brown, with white or occasion-
ally yellow spot at midpoint of outer margin of each wing; this pattern is particularly distinct on the hind wing and sometimes ill-defined on the fore wing, better defined in some species than in others. Underside (others): fore and hind wings with basal zone (to post-medial line) usually pale but occasionally dark, outer zone with a dark band or scattered markings. Underside (general): whitish patch sometimes present at apex of fore wing; discal spots small to moderately large, smaller and occasionally absent on the hind wing. Outer margin of wings usually slightly wavy; hind wing with costa occasionally short, anal margin slightly to moderately elongate.

Hind tibia of male usually with hair pencil but occasionally without; occasionally with short terminal extension. Thorax with fairly prominent, and abdomen with large, dorsal crests. Sternite 3 of male abdomen with pair of setal patches present, or weak or absent; segment 8 of male often with lateral pair of coremata.

**Male genitalia** (Figs 81, 82, 118, 119): Uncus usually somewhat curved and tapering from broader base to a slender rod. Gnathos usually U-shaped; median process barely present to well developed, varying (tongue, plate, hook-like or occasionally a pair of processes) but always smooth and without spinules. Pair of valvae usually fused antero-ventrally; valva long or of moderate length, often narrow; divided to varying degree into long costal lobe and very much shorter sacculus; costal lobe often also strongly divided, sometimes and/or with a narrow basal process, costa sometimes irregularly shaped or with processes, and valvae occasionally asymmetrical; minute process usually present towards base of sacculus in those species that have coremata in the abdomen. Coremata of genitalia present in majority of species and sometimes long. Transtilla usually weak and often indistinct. Saccus usually projecting little, but projecting distinctly in several species (e.g. *Albifusaria*).

**Female genitalia** (Figs 154, 155): Apophyses anteriores much shorter than apophyses posteriores. Ostial opening usually sclerotized, and in species of group 1 incorporating a triangular structure; lamella postvaginalis usually indistinct, lamella antevaginalis usually large, sclerotized, and medially excised. Ductus bursae short to long, sometimes with weak sclerotization forming an incomplete collar. Corpus bursae membranous, rounded to elongate; sigilla usually absent, but present in *Hypochromaria* as a transverse row of four longitudinal ridges, lightly sclerotized and appearing faint.

**Diagnosis:** *Aeolochroma* is a large and variable genus. Approximately half of the species have distinctive underside markings (in males at least), and are here referred to as group 1. These moths have a yellowish basal zone, a narrow whitish band on the outer side of the postmedial line, and a dark outer zone with a white or yellow spot at the midpoint of the outer margin of each wing. The majority of *Aeolochroma* species for which we have examined male genitalia have two characters present (usually correlated): the coremata in the abdomen and the minute process on the sacculus.

**Biological notes:** Host plants: Myrtaceae: *Leptospermum flavescens* Sm. (McFarland, 1988: 228, for *A. metarhodota* and *mnioria*), *Melaleuca leucadendra* (L.) L. and *M. quinquenervia* (Cav.) Blake (Robinson et al., website, 2005, for *A. quadrilinea*); Euphorbiaceae: *Beyeria leschenaultii* var. *latifolia* (McFarland, 1988: 293, for *A. sp.*). McFarland (1988: 293–299) described and figured the early stages of *Aeolochroma* sp.: egg (figs 999–1002); larva (figs 1003–1018) pale green, usually becoming dark green with minute purplish speckles dorsally and whitish-cream ventrally, with bright green subspiracular and midventral lines, and a diffuse cream spiracular line, body somewhat flattened dorsoventrally and with a roundly bilobed head; resting posture of mature larva sometimes rigid and straight, sometimes curved; pupa (figs 816–821).

**Distribution:** Australasian Region: Australia; Indonesia (Irian Jaya, Moluccas); New Caledonia; Papua New Guinea.

**Species included**

**Group 1 (see remarks above)**

- *Albifusaria albifusaria* (Walker, 1866) (Boarmia) [male and female genitalia]
- *A. discolor* (Warren, 1896d) (*Actenochroma*).
- *A. albifusaria suffusa* Prout, 1927 (*Aeolochroma*).
- *A. bakeri* Prout, 1913 (*Aeolochroma*).
- *A. intima* Prout, 1913 (*Aeolochroma*).
- *A. languida* (Warren, 1898) (*Actenochroma*) [male genitalia].
- *A. ruficaria* (Warren, 1907) (*Hypochroma*).
- *A. modesta* (Warren, 1903) (*Hypochroma*) [intermediate].
- *A. prasina prasina* (Warren, 1896b) (*Actenochroma*) [male and female genitalia].
- *A. prasina angustifascia* Prout, 1916a (*Aeolochroma*).
- *A. prasina defasciata* Prout, 1916a (*Aeolochroma*).
- *A. prasina louisa* Prout, 1927 (*Aeolochroma*).
- *A. prasina spadiocampa* Prout, 1917b (*Aeolochroma*).
- *A. saturataria* (Walker, 1866) (*Hypochroma*) [male genitalia].
- *A. caesia* (Warren, 1896b) (*Actenochroma*).
- *A. perfultvata* (Warren, 1899b) (*Hypochroma*).
**turneri** (Lucas, 1890) (*Hypochroma*) [male and female genitalia]

venia Prout, 1924 (*Aeolochroma*)

**viridimedia viridimedia** Prout, 1916a (*Aeolochroma*) [male genitalia]

**viridimedia recta** Prout, 1929 (*Aeolochroma*)

*Other species examined*

acanthina (Meyrick, 1888) (*Hypochroma*) [male genitalia]

amethystina (Warren, 1907) (*Actenochroma*) [male genitalia]

chioneschatia Prout, 1924 (*Aeolochroma*) [male and female genitalia]

**hypochromaria hypochromaria** (Gueneé, [1858]) (*Aplocera*)

bryophanes (Turner, 1904) (*Pseudoterpna*)

hypochromaria caledonica Holloway, 1979 (*Aeolochroma*) [male genitalia]

melaleucae (Goldfinch, 1929) (*Terpna*)

metarhodata (Walker, [1863]) (*Scotosia*) [male genitalia]

**mniaria** (Goldfinch, 1929) (*Terpna*) [male genitalia]

**purpurissa** (Warren, 1906) (*Hypochroma*)

**quadrilinea** (Lucas, 1892) (*Hypochroma*) [male genitalia]

**ochrea** (Warren, 1896d) (*Actenochroma*)

**subrubella** (Warren, 1903) (*Hypochroma*)

**subrubescens** (Warren, 1896a) (*Hypochroma*)

**unitaria** (Walker, 1860) (*Tephrosia*) [male genitalia]

**viridicata** (Lucas, 1890) (*Hypochroma*)

*Species not examined*

**rhodochlora** (Goldfinch, 1929) (*Terpna*)

**olivia** (Goldfinch, 1943) (*Terpna*)

**pammiges** (Turner, 1941) (*Terpna*)

**AUSTROTERPNA GOLDFINCH, 1929**

(Figs 36, 83, 120, 156)

* AustrotERPna Goldfinch, 1929: 385. Type species: *AustrotERPna idiographa* Goldfinch, 1929. [Treated in Section A of Geometrinae by McFarland (1988); here assigned to *Pseudoterpmini.*]

*Adults* (Fig. 36): Antenna in male bipectinate (with fairly short rami) from base to four-fifths or more, simple filiform in female. Frons not protruding significantly. Labial palpus rough-scaled, with third segment short in both sexes, particularly in male.

Wing pattern: fore wing grey to brown, mottled with dark brown or blackish short striations and dots, and also pale flecks, giving an overall brownish grey appearance except for some darker lines and other markings, and with a dark dentate streak slanting subapically from costa to postmedial line, a slightly paler area between this and narrow discal dash; postmedial line dentate and strongly angled at vein CuA2, antemedial line often almost straight but sometimes wavy; sometimes with a dark streak above anal vein from base of wing to antemedial line. Hind wing grey or greyish brown, with basal zone pale and occasionally whitish but contrasting only slightly to moderately with darker outer zone; discal spot shorter and fainter than on fore wing. Underside: fore wing with large pale basal zone and smaller dark outer zone varying from distinctly contrasting to only very diffuse and faint; discal spot or dash strong to weak; hind wing similar to upper side but with stronger dark and pale contrasting markings, outer zone dark except pale at outer margin of wing. Outer margin of wings very slightly wavy, almost smooth; hind wing with costa and anal margin of moderate length, outer margin usually weakly angled at vein CuA1. Veins Rs and M1 of hind wing on a stalk.

Hind tibia of male without hair pencil. Thorax with a strong dorsal crest but abdomen without crests; sternite 3 without setal patches.

*Male genitalia* (Figs 83, 120): Uncus rod-like, short and slightly curved. Gnathos approximately V-shaped, with arms broadened towards median process, which is also V-shaped and has a small posterior tooth. Pair of valvae fused antero-ventrally; valva deeply divided into a long, very narrow, costal lobe, and a shorter lobe that is also very narrow but tapered and pointed, with another less conspicuous lobe in between the two, much shorter, broad-based and tapered; costal lobe divided distally into a pointed, sinuous, spine-like process and a bulbous, oval, membranous lobe. Coremata absent. Transtilla forming a pair of lightly sclerotized adjoining lobes, each with a pouch. Juxta forming a pair of shallow pouches anteriorly. Saccus not differentiated from vinculum. Aedeagus moderately slender anteriorly but often broader posteriorly; vesica with two strong spines, one on a caecum.

*Female genitalia* (Fig. 156): Apophyses anteriores short and broadened, much shorter than apophyses posteriores. Lamella postvaginalis very smoothly sclerotized, forming a raised tongue-shaped lobe; lamella antevaginalis projecting as a subrectangular plate; both lamellae strongly defined. Ductus bursae large, bulbous, and wrinkled, with large strongly sclerotized antrum forming an incomplete collar. Corpus bursae small, barely larger than ductus bursae; membranous, oval, tapering anteriorly; signum absent.

**Diagnosis:** Moths of *AustrotERPna* resemble some of those of *Rhuma*, particularly if a dark streak is present above the anal vein of the fore wing. The male genitalia are very different: *AustrotERPna* is
Figures 156–162. Female genitalia. 156, Austroterpna idiographa; 157, Heliomystis electrica; 158, Lophothorax eremnopis; 159, Protophyta castanea; 160, Rhuma subaurata; 161, Rhuma argyraspis; 162, Rhuma thiobapta.
characterized by the complex valva, with three main lobes of which the costal lobe is divided distally as described above, whereas the valva is undivided in *Rhuna*.

**Biological notes:** Host plants: Mimosaceae: *Acacia rivalis* JM Black (McFarland, 1988: 252, for *Austroterpna paratorna*); *Acacia nerifolia* A. Cunn. ex Benth. (McFarland, 1988: 228, for *Austroterpna idiographa*). McFarland (1988: 249–256) described and figured the early stages of *Austroterpna*: egg (fig. 759, *idiographa*); larva green, with a whitish spiracular line or more heavily marked with dark reddish-purple, head tapered and with an apical notch (figs 760–766, 781–792, both species); pupa (figs 767–770, 793–796, both species).

**Distribution:** Australasian Region: Australia (New South Wales, South Australia).

**Species included**
- *idiographa* Goldfinch, 1929 (*Austroterpna*) [male and female genitalia]
- *paratorna* (Meyrick, 1888) (*Hypochroma*) [male and female genitalia]

**HELIOMYSTIS MEYRICK, 1888**

(Figs 37, 84, 121, 157)


**Adults** (Fig. 37): Antenna bipectinate in male, simple filiform in female. Frons not protruding significantly. Labial palpus with third segment short in male, longer in female.

Wing pattern: fore wing mottled shades of brown with black speckles and lines, lines usually stronger in female and diffuse whitish patches present, particularly on inner side of postmedial line; antemedial line dentate, postmedial line straight and slanting from costa to vein M₃, then sharply angled and dentate, area between the two lines occasionally very dark (McFarland 1988: Fig. 249; white submarginal line broken and diffuse. Hind wing with large basal zone, usually bright, orange-yellow, to dark, diffuse postmedial line; basal zone contrasting strongly with mid to dark brown outer zone. Fore and hind wings with discal spot, a dash. Underside: fore and hind wings usually with large basal zone yellow or yellowish, spreading from base to greater or lesser extent, blackish discal spots large and oval, and white patch present between discal spot and outer zone; outer zone with broad dark brown or blackish band (more pronounced on hind wing), and with paler region of brown and white from outside this band to the wing margin.

Outer margin of wings slightly wavy; fore wing moderately elongate, hind wing with costa not short and anal margin slightly elongate.

Hind tibia of male with hair pencil. Thorax and abdomen with dorsal crests strongly developed, especially on thorax. Sternite 3 of male abdomen with a pair of widely spaced setal patches.

**Male genitalia** (Figs 84, 121): Uncus slender and rod-like. Socii clearly developed but completely fused with anal tube. Gnathos approximately V-shaped, with short tongue-like, spinulose, median process. Valva of moderate length and fairly narrow; slightly divided, but with tapered sacculus very small in relation to main part of valva (i.e. costal lobe); costal lobe approximately parallel-sided and with ridge just in from costa. Coremata absent. Transtilla forming a pair of adjoining lobes, large and lightly sclerotized. Juxta with lateral tufts of long hair-like setae. Saccus projecting slightly. Aedeagus slender, with a long sclerotized process arising between anterior end and midpoint, and projecting posteriorly; vesica with numerous spine-like cornuti.

**Female genitalia** (Fig. 157): Apophyses anteriores fairly long, of similar length to apophyses posteriores. Lamella postvaginalis weakly defined, lightly sclerotized, with transverse wrinkles and minute ‘pimples’; lamella antevaginalis similar but more distinctly sclerotized, and broader. Ductus bursae moderately long and wrinkled, with smooth sclerotized antrum. Corpus bursae membranous and elongate; signum absent.

**Diagnosis:** The large orange–yellow area of the hind wing of *Heliomystis* (very different from the fore wing) is distinctive, except for a strong resemblance to some species of *Dindica*. *Heliomystis* is readily distinguished by the large discal spot on the underside of the hind wing, whereas the discal spot is absent or weak in *Dindica* (compare Figs 8B, 37B). The genitalia are very different: in the male, *Heliomystis* has a rod-like uncus, and socii that are not strongly developed and are unique in the Pseudoterpnini in being fused with the anal tube, whereas *Dindica* has a well-sclerotized bifid socii/uncus complex; *Heliomystis* does not have the sacculus overlapping the costal lobe as in *Dindica*, and the female genitalia do not have such extensive, complexly wrinkled, and sclerotized, ostial surrounds as in *Dindica*.

**Biological notes:** Host plants: Myrtaceae: *Eucalyptus dives* Schauer (Common, 1990: 371), and *E. obliqua* L’Herit. (McFarland, 1979: 37, 1988: 267, for captive larvae, which thrived on that plant species but not on others offered). McFarland (1988: 249, 252) described and figured the early stages of *Heliomystis*: egg (figs 858–861); larva (figs 862–871) green, often darker ventrally or sometimes dorsally, with a whitish...
spiracular line, head tapered and almost pointed, with a medial groove, typical resting posture of mature larva straight or slightly curved, with thoracic legs held together and projecting from the body like a thorn from a stick; pupa (figs 872–875).

Distribution: Australasian Region: Australia [New South Wales, Queensland, South and Western Australia (McFarland, 1988), Tasmania (McQuillan, 2004), Victoria].

Species included

clectrica Meyrick, 1888 (Heliomystis) [male and female genitalia]

LOPHOTHORAX TURNER, 1939
(Figs 38, 85, 122, 158)


Adults (Fig. 38): Antenna of male bipectinate from base to near apex. Antenna of female also bipectinate but with rami shorter, approximately half the size of those of the male (Vanna Rangsi, pers. comm.). Frons not protruding significantly. Labial palpus very rough-scaled, with third segment short.

Wing pattern: overall mottled brown, slightly greyish, dark on fore wing and paler on hind wing; with short striations, more pronounced near margins and stronger on fore wing; fore wing with some blackish speckles, and dentate antemedial and postmedial lines; postmedial line irregularly curved, and strongly angled at vein CuA2; fore wing also with small cream dashes and diffuse patches; discal spot blackish, forming an irregular dentate line, sometimes shaped like an M turned sideways (as in McFarland, 1988: figs 937, 938); hind wing fairly plain, postmedial line and discal dash usually faint. Underside dappled with more pale (whitish) markings than upper side, fore and hind wings with diffuse darker brown blotches (one fairly large, towards costa, and one smaller, below) situated outside postmedial line; narrow whitish band immediately on outer side of postmedial line, broken by brown veins; hind wing not plain as on upper side, and fore and hind wings generally similar, but markings somewhat fainter on lower half of fore wing; discal spots on fore and hind wings forming short dashes. Outer margin of wings wavy; hind wing with costa and anal margin of moderate length.

Hind tibia of male without hair pencil. Abdomen without dorsal crests; sternite 3 without setal patches.

Male genitalia (Figs 85, 122): Uncus rod-like, of moderate length, apical half curved and somewhat hood-shaped. Gnathos with broad arms and with tongue-like median process, without spinules. Pair of valvae fused antero-ventrally; valva divided into a long, moderately narrow, costal lobe, and a short sacculus (both lobes blunt or bluntly rounded in the sole species: eremnopis). Coremata absent. Transtilla forming a pair of long pouches anteriorly; juxta without obvious features. Saccus not projecting anteriorly from vinculum. Aedeagus slender, with a long and very narrow sclerotized posterior process; vesica with a large wrinkled sclerite.

Female genitalia (Fig. 158): Sternite 8 forming medial pair of large sclerotized lobes. Apophyses anteriores absent or extremely short. Lamella postvaginalis not distinct, ostial opening with very slight anterior lip, lamella antevaginalis forming a broad subrectangular plate, lightly sclerotized and largely smooth. Ductus bursae short and moderately broad, sclerotized, smooth posteriorly but wrinkled towards where it joins with corpus bursae. Corpus bursae wrinkled posteriorly and smoothly membranous anteriorly, pear-shaped; signum absent.

Diagnosis: Moths of Lophothorax are rather similar to those of Austroterpna: fairly small and brownish, but without a distinct darker outer zone on the hind wing (upper side) as is present to varying degree in Austroterpna. The M-like marking on the fore wing of Lophothorax is often distinctive. Lophothorax is one of only a few genera in the Pseudoterpnini with the antennae bipectinate in the female [the others are Limbatochlamys, Mimandria, Pachista, Holoterpna (sometimes), and Lophophilma and Psilotagma (one species each)], whereas in other genera they are usually simple filiform. The male genitalia of Lophothorax are like those of Aeolochroma and Austroterpna in having the pair of valvae fused antero-ventrally and each valva divided, but the valva of Lophothorax is simply divided into two lobes, not three or more as in Austroterpna, and Lophothorax does not have the apomorphies present in the majority of species of Aeolochroma (coremata in the abdomen and a minute process on the sacculus).

Biological notes: Host plant(s): Sapindaceae: Dodonea bursariifolia F.Muell. (McFarland, 1979: 36–37, 1988: 284.) McFarland (1988: 284–285) described and figured early stages of Lophothorax: larva (figs 942–955) green, slightly darker dorsally, sometimes with a broken whitish line that is barely subspiracular; larva firm and plump when fully grown, resting posture varying from rigid and fairly straight to arched, twisted or curved; pupa (figs 956–958). Several of McFarland’s larvae were parasitized, some by an unidentified wasp and two by a tachinid fly (Ethylla sp.).

Distribution: Australasian Region: Australia (South and Western Australia).
Species included
eremnopis (Turner, 1922) (Crypsiphona) [male
genitalia]
alamphodes Turner, 1939 (Lophothorax)

PROTOPHYTA TURNER, 1910
(Figs 39, 86, 123, 159)

Protophyta Turner, 1910: 564 (key), 648. Type species: 
Pseudoterpna castanea Lower, 1898. [Here assigned 
to Pseudoterpnini.]

Adults (Fig. 39). Antenna of male bipecinate from
base to near apex, simple filiform in female. Frons pro-
truding slightly. Labial palpus with third segment
moderately long in male, shorter in female.

Wing pattern: fore and hind wings overall fairly pale
brown, with several brown transverse slanting wavy 
lines and grey or brown fasciae, usually faint in male 
but forming more distinct and contrasting bands in 
female, and female generally greyer; discal spot tiny
or sometimes absent on fore wing, absent on hind 
wing. Underside: fore wing with large pale, almost
whitish brown, basal zone up to transverse postmedial 
line, and in outer zone a darker brown band, some-
times very diffuse and faint, on inner side of submarginal 
line; hind wing mainly pale whitish brown, but 
with dark brown blotch on inner side of submarginal 
line from costa to vein M1; discal spots small. Outer 
margin of wings wavy, and hind wing usually with a 
slightly larger emargination between veins M1 and M3;
hind wing with costa and anal margin of moderate 
length.

Hind tibia of male without hair pencil. Abdomen 
without dorsal crests; sternite 3 without setal patches.

Male genitalia (Figs 86, 123): Uncus tapering from 
base but mainly rod-like. Gnathos with a large median 
tongue, with minute 'pimplies' ventrally. Valva not 
divided, moderately narrow and tapered apically, with 
sclerotized costal band well defined by a low ridge 
ong long inner side but without other processes. Core-
mata absent. Transtilla with pair of broad sclerotized 
arms, each with a shallow anterior pouch. Juxta large 
and smooth. Saccus projecting strongly, narrow and 
finger-like. Aedeagus with small sclerite in vesica, 
near where it arises from aedeagus, and a more distal 
sclerotized patch.

Female genitalia (Fig. 159): Genitalia large and elon-
gate. Ovipositor valves only weakly papillate but with 
strong spine-like setae. Apophyses anteriores long, but
less than half length of very elongate apophyses pos-
teriores. Lamella postvaginalis well defined, smoothly 
sclerotized, and with long narrow lateral extensions. 
Region around ostium wrinkled but largely membra-
nous, except for sclerotized ventral rim of ostium. Duc-
tus bursae and corpus bursae membranous, corpus 
bursae long; tiny signum present towards anterior 
end, round and rugose with short projections.

Diagnosis: The pattern of fasciae on the wings of Pro-
tophyta is fairly distinctive. In the male genitalia, the 
valva is more simple and plain than others in this 
group of genera that have the socii vestigial or absent;
the valva is not divided as in Aeolochroma, Austroter-
pna, Heliomystis and Lophothorax, and it does not 
have the field of hair-like setae, the small process 
towards the base of the valva and the curved ridge 
extending from it that are present in Rhuma. Proto-
phyta females have unusually long apophyses posteri-
ores (for Pseudoterpnini) and the genus is one of a 
minority of Pseudoterpnini that have a signum. Pro-
tophyta benigna (not examined here) was described as 
is similar to castanea but larger and more distinctly 
marked (Turner, 1939).

Distribution: Australasian Region: Australia (South 
and Western Australia).

Species included
benigna Turner, 1939 (Protophyta)
castanea Lower, 1898 (Pseudoterpnina) [male genitalia]

RHUMA WALKER, 1860
(Figs 40–42, 87–89, 124–126, 160–162)

Rhuma Walker, 1860: 312, 483. Type species: 
Rhuma subaurata Walker, 1860. [Here assigned to 
Pseudoterpnini.]
Sterictopsis Warren 1898: 257. Type species: 
Sterictopsis inconsequens Warren, 1898 [junior synonym of 
Sterictopsis argyraspis (Lower)], [Treated in Section 
Oxyphanes Turner, 1936: 27. Type species: Oxyphanes 
suspected a close relationship with Sterictopsis.] 

Syn. nov.

Adults (Fig. 40–42): Antenna in male bipecinate from 
base to three-quarters or more, or (subaurata) 
finely fasciculate, weakly ciliate or simple filiform in 
female. Frons usually not protruding significantly but
occasionally protruding moderately. Labial palpus 
with third segment short in both sexes, particularly in 
male. Labial palpus with third segment short to very 
short in both sexes, particularly in male.

Wing pattern: fore wing grey to brown mottled with
white or cream and flecks of dark or blackish brown, 
giving an overall brownish grey appearance except for 
some darker lines and other markings, or (subaurata) 
with strong pattern of mainly cream medial region 
contrasting with mainly brown inner and outer 
regions, and with dark spots and other markings;
sometimes with dark spots or small blotches where lines and discal spot meet costa, and some species (*argyraspis* and *thiobapta*) with a dark line from base to halfway or more along anal vein; postmedial line faint or broken, dentate and angled, other lines indistinct or broken, except antemedial line distinct in *argyraspis*; discal spot indistinct or distinct, sometimes a dark ring around a pale centre. Hind wing with large pale basal zone, cream or whitish lightly flecked with brown, contrasting with dark brown or greyish outer zone, or (*subaurata*) hind wing mainly brown, with dark spots, and a few white spots, representing broken lines; discal spot varying from very weak and small or absent to fairly large and diffuse or a dark wing with pale centre. Hind wing with very large cream or (*subaurata*) yellow basal zone, contrasting with smaller outer zone, which is dark brown either with whitish dashes between veins to outer margin or with yellow margin; hind wing similar to upper side but sometimes with stronger markings, or (*subaurata*) similar to underside of fore wing; discal spot or dash usually moderately large on fore wing but sometimes small or indistinct on hind wing. Outer margin of wings slightly wavy or smoothly curved; fore wing longer than hind wing, in which costa is fairly short but anal margin not particularly elongate. Frenulum not usually reduced, but cited as reduced for an undescribed species of *Sterictopsis* by Young (2006). Vein M₁ of fore wing sometimes on a short stalk with veins R₅,₆, but often not stalked; veins R₅ and M₁ of hind wing usually on a stalk, but separate in *subaurata*.

Hind tibia of male with hair pencil and with short to long terminal extension. Abdomen and sometimes thorax with large or small dorsal crests; sternite 3 of male abdomen with a pair of setal patches (large and merged in *subaurata*).

**Male genitalia** (Figs 87–89, 124–126): Genitalia of species formerly in *Sterictopsis* and *Oxyphanes* not heavily sclerotized. Uncus tapering from base (often broad) to rod, curved and very slender, or spatulate apically. Gnathos V-shaped, with a pointed median process, usually either serrate or with a few spinules or near apex. Valva not divided, either moderately broad and with fairly truncate apex or more elongate and tapered, often curved, particularly outer (non-costal) margin; costa with (*subaurata*) or without a weak lobe; valva with ventral field of long hair-like setae extending well away from distal end of valva, often pronounced; valva with a small ventral finger- or plate-like process (or harpe) towards base, with a low ridge extending posteriorly from it, curved and usually sinuous, usually forming a shallow pouch. Coremata absent. Transtilla often lightly sclerotized, with arms joined either as a simple band or arched and forming a pair of pouches anteriorly. Juxta smooth and lightly sclerotized, with a postero-lateral pair of sclerites. Saccus tapered and projecting weakly or distinctly. Aedeagus usually with posterior tongue or finger-like process or extension; vesica with one or sometimes two sclerotized processes or plates, or occasionally without obvious cornuti.

**Female genitalia** (Figs 160–162): Ovipositor valves often modified: only lightly sclerotized and weakly papillate (species formerly in *Sterictopsis* and *Oxyphanes*), not truncated or appearing as oblique as in other Pseudoterpnini (species formerly in *Sterictopsis*), or ovipositor valves joined postero-dorsally by small smooth V-shaped sclerite, and valves more curved than usual in Pseudoterpnini (species formerly in *Oxyphanes*). Apophyses anteriorei either fairly long or moderately short, but always shorter than apophyses posteriores. Lamella postvaginalis weakly defined, with several transverse wrinkles, or membranous and not defined. With (*subaurata*) very broad, weakly wrinkled, region present around ostium; lamella antevaginalis forming a sclerotized, semicircular plate, projecting lip-like from ostium; other species without this. Ductus bursae very short to moderately long, usually somewhat sclerotized. Corpus bursae membranous, variously shaped, occasionally narrower anteriorly, fairly small to very large and long; small signum present towards anterior end, oval and rugose with short spinules (*subaurata*), or signum absent.

**Diagnosis:** Moths of *Rhuma* often resemble those of *Austroterpna*, particularly if a dark streak is present above the anal vein of the fore wing, although *R. subaurata* is patterned differently (see above). The male genitalia are very different: the valva is undivided in *Rhuma* but divided in *Austroterpna*. *Rhuma* is characterized by the valva with a ventral field of long hair-like setae (extending well away from the distal end of valva, unlike in *Heliomystis*), and with a small process towards the base of the valva and a curved ridge extending from it, and also by the postero-lateral sclerites extending from the juxta. These characters are shared by *Rhuma* and the former genera *Sterictopsis* and *Oxyphanes*, which are consequently synonymized here.

**Biological notes:** Host plants: Myrtaceae: *Eucalyptus* spp, including *odorata* Behr (McFarland, 1979: 39, 1988: 288, for *argyraspis*). McFarland (1988: 288–292) described and figured the early stages of *argyraspis*: egg (fig. 964–966); larva (figs 967–983) instars except first yellowish olive-green, shading to pinkish or reddish brown laterally and ventrally, and maturing with brown dorsal markings, head bilobed, resting posture of larva rigid, straight and stick-like; pupa (figs 984–
986). Early stages and host plants of other species unknown.

Distribution: Australasian Region: Australia [New South Wales, Queensland, South Australia, Tasmania (McQuillan, 2004)].

Species included 

argyraspis (Lower, 1893) (Pseudoterpn) [male and female genitalia]

inconsequens (Warren, 1898) (Sterictopsis) 
diversens (Goldfinch, 1929) (Sterictopsis) [male genitalia] 

subaurata Walker, 1860 (Rhuma) [male and female genitalia] 

thiobapta Turner, 1936 (Oxyphanes) [male and female genitalia]

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