Review of recent taxonomic changes to the emerald moths (Lepidoptera: Geometridae: Geometrinae)

David Plotkin†§, Akito Y. Kawahara§
† Department of Entomology and Nematology, University of Florida, Gainesville, United States of America
§ Florida Museum of Natural History, Gainesville, United States of America

Corresponding author: David Plotkin (dplotkin@ufl.edu)
Academic editor: Shinichi Nakahara
Received: 18 Mar 2020 | Accepted: 14 Apr 2020 | Published: 30 Apr 2020
Citation: Plotkin D, Kawahara AY (2020) Review of recent taxonomic changes to the emerald moths (Lepidoptera: Geometridae: Geometrinae). Biodiversity Data Journal 8: e52190.
https://doi.org/10.3897/BDJ.8.e52190

Abstract

Background

The subfamily Geometrinae (Lepidoptera: Geometridae), commonly known as emerald moths, is an ecologically diverse group of moths with over 2,500 described species. Many taxonomic and phylogenetic studies of Geometrinae have been undertaken in the past decade, resulting in hundreds of new taxonomic changes since online publication of the most recent checklist in December 2007.

New information

This review synthesises the last 12 years of alpha-taxonomic research in Geometrinae. A comprehensive list of Geometrinae genus- and species-group descriptions, synonymies, combinations and other taxonomic changes, made since 2007, is provided. Since 2007, the known species richness of Geometrinae has increased from 2,529 to 2,642 species; an updated list of all these species is presented in a supplementary spreadsheet.
Introduction

The family Geometridae is an incredibly diverse lineage of moths that contains over 23,000 described species, making it the second-most speciose family in all of Lepidoptera (Scoble and Hausmann 2007, van Nieukerken et al. 2011). Although the subfamily Geometrinae only comprises roughly one-tenth of this species richness, it is one of the more recognisable geometrid subfamilies because of the green colouration found in most adults and some larvae. Geometrinae are consequently known as ‘emerald moths’ and have been the subjects of studies on phenotypic plasticity and polyphenism (Greene 1989, Canfield et al. 2008). Many authoritative taxonomic works on Geometrinae have been published over the years, but with many new species being described annually, it does not take long for an update to become necessary.

Parsons et al. (1999) published a two-volume catalogue of the geometrid moths of the world, which is currently the most recently printed work that contains a comprehensive checklist of the global emerald moth fauna. However, between 1999 and 2007, one of this checklist’s co-authors, Malcolm Scoble, worked with Axel Hausmann to update the checklist; these revisions are hosted on the Lepidoptera Barcode of Life website. At the time of the most recent update (December 2007), the online checklist contained 269 genera and 2,529 species of Geometrinae. Since then, hundreds of taxonomic changes have been made in this subfamily, including over 100 new species. In this review, we catalogue the last 12 years of emerald moth taxonomy and update the list of geometrines provided by Scoble and Hausmann (2007) to include all newly-described emerald moth species.

Materials and methods

Updates and changes to the online checklist of Geometrinae are presented in alphabetical order by genus, following the format used by Scoble and Hausmann (2007). Since their checklist was last updated in December 2007, the taxonomic literature published between January 2008 and December 2019, inclusive, was consulted. It was also found that some taxonomic works (e.g. Beljaev 2007) were published prior to December 2007, but were not incorporated into the update; these are consequently included in this review.

Within each genus section, valid species names are listed in alphabetical order, with junior synonyms placed on an indented line following the corresponding senior synonym. Only genus- and species-group taxonomic changes in Geometrinae are discussed here; a review of recent family-group taxonomic changes can be found in Ban et al. (2018) and Murillo-Ramos et al. (2019), both of whom have also proposed new taxonomic changes to the geometrine tribes and subtribes, based on molecular phylogenetic data. Scoble and
Hausmann (2007) did not include subspecies in their checklist, but post-2007 taxonomic changes to subspecies are discussed in this review.

The type of taxonomic change is indicated in parentheses. In this catalogue, the word 'new' and the abbreviation 'nov.' (novus, -a, -um) both denote that a taxonomic change was recent enough to not appear in the checklist of Scoble and Hausmann (2007). In this review, no taxonomic changes are proposed for the first time; this is further emphasised by the use of quotation marks surrounding each record of taxonomic change in the Results. Citations for recent taxonomic changes are provided in corresponding Remarks sections for each genus. The vast majority of taxonomic changes discussed here were proposed based solely on morphological evidence, such as variation in colour patterns, wing venation and genital characters of the adults. If molecular evidence were used to justify a taxonomic change, this is noted in the corresponding Remarks section.

If the status of a subspecies has been changed or a new synonymy has been proposed, the name of the associated valid species name is provided for context. Otherwise, species that have not undergone any taxonomic changes since the publication of Scoble and Hausmann (2007) are not included in the main text; a full list of all current Geometrinae species names is provided in the supplementary material. Similarly, synonyms that are not directly associated with a recent taxonomic change are excluded from the text.

Multiple Latin abbreviations for standard taxonomic terms are used throughout the text. Since the abbreviations themselves are not standardised across all taxonomic literature and do not appear at all in Scoble and Hausmann (2007), the notation used by Kitching et al. (2018) for a recent checklist of bombycoid moths was applied here in both the main text and supplementary material. These abbreviations and their definitions, are as follows:

“comb. nov.” – new combination
“comb. rev.” – revived combination
“gen. nov.” – new genus
“nom. nov.” – new replacement name
“nom. nud.” – nomen nudum (without description, thus unavailable)
“sp. nov.” – new species
“ssp. nov.” – new subspecies
“stat. nov.” – new status
“stat. rev.” – revived status
“syn. nov.” – new synonym
“syn. rev.” – revived synonym
Data resources

The list of taxonomic changes made in Geometrinae since publication of Scoble and Hausmann (2007) and the updated list of emerald moth species of the world are provided as tables (Excel format) in Suppl. material 1.

List of Geometrinae genera and species associated with recent taxonomic changes

Genus *Acidaliastis* Hampson, 1896

**Nomenclature:**

*Acidaliastis porphyretica* Prout, 1925  
*Acidaliastis subbrunnescens* Prout, 1916

**Notes:** The AfroMoths database (De Prins and De Prins 2019) states, without a citation, that *Acidaliastis porphyretica* was transferred to the genus *Acidromodes* Hausmann, 1996 and that *Acidaliastis subbrunnescens* was transferred to *Hemidromodes* Prout, 1916. After searching the literature, these names were found on other online species lists, but there did not appear to be any formal publications that proposed these new combinations. Thus, *Acidaliastis porphyretica* and *Acidaliastis subbrunnescens* are currently considered the valid names for these species.

Genus *Agathia* Guenée, [1858]

**Nomenclature:**

*Agathia microlaetata* Goyal, Kirti & Saxena, 2018 ("sp. nov.")

**Notes:** The name and locality of *Agathia microlaetata* appeared in Kirti et al. (2012), but this new species was not formally described until it appeared in Goyal et al. (2018).

Genus *Albinospila* Holloway, 1996

**Nomenclature:**

*Albinospila juancarlosi* Tautel & Barrion-Dupo, 2017 ("sp. nov.")  
*Albinospila variifrons* (Prout, 1917) ("comb. nov.")

**Notes:** One new species was described (Tautel and Barrion-Dupo 2017). *Albinospila variifrons* was transferred from *Comostola* Meyrick, 1888 by Tautel and Barrion-Dupo (2017).
Genus *Aoshakuna* Matsumura, 1925 ("stat. rev.")

**Nomenclature:**

*Nipponogelasma* Inoue, 1946 ("syn. nov.")
*Aoshakuna lucia* (Thierry-Mieg, 1916) ("comb. nov.")
*Aoshakuna sachalinensis* Matsumura, 1925 ("syn. nov.")
*Aoshakuna lucia ussurica* Beljaev, 2007 ("ssp. nov.")

**Notes:** One new subspecies was described (Beljaev 2007). *Aoshakuna* was previously a junior synonym of *Chlorissa* Stephens, but was reinstated by Beljaev (2007). In the same revision, Beljaev (2007) subsequently designated *Nipponogelasma* a junior synonym of *Aoshakuna*. As a result of this synonymy, *Nipponogelasma lucia* was transferred to *Aoshakuna*, creating the new combination *A. lucia*. Beljaev (2007) then synonymised this species with *A. sachalinensis*, the type species of *Aoshakuna*.

Genus *Assachlora* Viidalepp & Lindt, 2012 ("gen. nov.")

**Nomenclature:**

*Assachlora assa* (Druce, 1892) ("comb. nov.")
*Assachlora julietae* Viidalepp & Lindt, 2012 ("sp. nov.")
*Assachlora mitigata* (Prout, 1912) ("comb. nov.")

**Notes:** One new species was described in this new genus (Viidalepp and Lindt 2012). *Assachlora assa* and *A. mitigata* were transferred from *Phrudocentra* Warren, 1895 by Viidalepp and Lindt (2012). *Assachlora* currently contains three species, with *A. assa* designated as the type species.

Genus *Bathycolpodes* Prout, 1912

**Nomenclature:**

*Bathycolpodes parexplanata* Karisch & Hoppe, 2010 ("sp. nov.")
*Bathycolpodes roehrichti* Karisch, 2010 ("sp. nov.")
*Bathycolpodes scheeli* Karisch & Hoppe, 2010 ("sp. nov.")
*Bathycolpodes subferrata* Prout, 1930 ("stat. nov.")
*Bathycolpodes subfuscata* (Warren, 1902)

**Notes:** Three new species were described (Karisch 2010). Although Henri Hoppe is credited with co-authorship of the new species *Bathycolpodes parexplanata* and *B. scheeli* in Karisch (2010), he is not credited as an author of the publication.
The subspecies *Bathycolpodes subfuscata subferrata* was elevated to the species *B. subferrata* by Karisch (2010).

Genus *Bustilloxia* Expósito, 1979

**Nomenclature:**

*Bustilloxia saturata* (Bang-Haas, 1996)

*Bustilloxia saturata iberica* Hausmann, 1995 ("syn. nov.", followed by “stat. rev.”)

**Notes:** Leraut (2009) changed the status of *Bustilloxia saturata iberica* from a subspecies to a junior synonym of *B. saturata*. Müller et al. (2019) later revived *B. s. iberica* as a valid subspecies.

Genus *Chlorissa* Stephens, 1831

**Nomenclature:**

*Chlorissa archipelago* Tautel, 2016 ("sp. nov.")

*Chlorissa obliterata* (Walker, 1863) ("syn. nov.", followed by “stat. rev.”)

*Chlorissa viridata* (Linnaeus, 1758)

**Notes:** One new species was described (Tautel 2016). Leraut (2009) synonymised *Chlorissa obliterata* with *C. viridata* and Müller et al. (2019) subsequently revived its status as a valid species.

Genus *Chloristola* Holloway, 1996

**Nomenclature:**

*Chloristola murzini* Tautel, 2016 (“sp. nov.”)

**Notes:** One new species was described (Tautel 2016).

Genus *Chlorochromodes* Warren, 1896

**Nomenclature:**

*Comostolodes* Warren, 1896 ("syn. nov.")

*Chlorochromodes albicatena* (Warren, 1896) ("comb. nov.")

*Chlorochromodes chlorochromodes* (Prout, 1916) ("comb. nov.")

*Chlorochromodes dialitha* (West, 1930) ("comb. nov.")

*Chlorochromodes rhodocraspeda* Han, Galsworthy & Xue, 2012 ("sp. nov.")

*Chlorochromodes tenera* (Warren, 1896) ("comb. nov.")

*Chlorochromodes tumona* Tautel, 2016 ("sp. nov.")
Notes: Two new species were described (Han et al. 2012, Tautel 2016). *Comostolodes* was designated a junior synonym of *Chlorochromodes* by Han et al. (2012), who consequently formed new combinations for four species formerly in *Comostolodes*.

**Genus Chloroglyphica** Warren, 1894

Nomenclature:

*Chloroglyphica glaucochrista* (Prout, 1916)

*Chloroglyphica glaucochrista grearia* (Oberthür, 1916) (“syn. nov.”)

Notes: The status of *Chloroglyphica glaucochrista grearia* was changed from subspecies to junior synonym of *C. glaucochrista* by Han and Xue (2011a).

**Genus Chlororithra** Butler, 1889

Nomenclature:

*Chlororithra fea* Butler, 1889

*Chlororithra missioniaria* Oberthür, 1916 (“stat. nov.”)

Notes: *Chlororithra missioniaria* was originally described as a variation of *C. fea* by Oberthür (1916). Parsons et al. (1999) instead treated *C. missioniaria* as a junior synonym of *C. fea*, so the name was absent from the checklist of Scoble and Hausmann (2007); however, prior to the publication of the checklist, *C. missioniaria* was designated a distinct species of *Chlororithra* by Han et al. (2006).

**Genus Comibaena** Hübner, [1823]

Nomenclature:

*Comibaena auromaculata* Han, Galsworthy & Xue, 2012 (“sp. nov.”)

*Comibaena bellula* Han, Galsworthy & Xue, 2012 (“sp. nov.”)

*Comibaena birectilinea* Han, Galsworthy & Xue, 2012 (“sp. nov.”)

*Comibaena decoria* Han, Galsworthy & Xue, 2012 (“sp. nov.”)

*Comibaena levequei* Leraut, 2009 (“sp. nov.”)

*Comibaena nigromacularia* (Leech, 1897)

*Comibaena delicatior* (Warren, 1897) (“syn. nov.”)

*Comibaena parornatoria* Han, Galsworthy & Xue, 2012 (“sp. nov.”)

*Comibaena pictipennis* Butler, 1880

*Comibaena pictipennis superornatoria* (Oberthür, 1916) (“syn. nov.”)

*Comibaena sheni* Han, Galsworthy & Xue, 2012 (“sp. nov.”)

*Comibaena tibetensis* Han, Galsworthy & Xue, 2012 (“sp. nov.”)
Comibaena theodori Hausmann & Parisi, 2014 (“sp. nov.”)

**Notes:** Nine new species were described (Han et al. 2012, Hausmann et al. 2014).

Müller et al. (2019) noted that Comibaena levequei may be identical to C. pseudoneneraria Wehrli, 1926, but tentatively accepted it as a distinct species. Comibaena delicatior was synonymised with C. nigromacularia by Han and Xue (2011a). Comibaena pictipennis superornata was its status changed from subspecies to junior synonym of C. pictipennis by Han et al. (2012).

**Genus Comostola Meyrick, 1888**

**Nomenclature:**
- *Comostola christinaria* (Oberthür, 1916) (“comb. nov.”)
- *Comostola desdemona* Tautel, 2015 (“sp. nov.”)
- *Comostola romblonensis* Tautel & Barrion-Dupo, 2017 (“sp. nov.”)
- *Comostola stueningi* Tautel & Barrion-Dupo, 2017 (“sp. nov.”)

**Notes:** Three new species were described (Tautel 2015, Tautel and Barrion-Dupo 2017). Comostola christinaria was transferred from Hemistola Warren, 1893 by Han and Xue (2009).

**Genus Crypsiphona Meyrick, 1888**

**Nomenclature:**
- *Crypsiphona tasmanica* Öunap & Viidalepp, 2009 (“sp. nov.”)

**Notes:** One new species was described (Öunap and Viidalepp 2009).

**Genus Dindica Moore, 1888**

**Nomenclature:**
- *Dindica purpurata* Bastelberger, 1911
- *Dindica wytsmani* Prout, 1927 (“stat. rev.”)

**Notes:** Dindica purpurata wytsmani was elevated from subspecies to species by Pitkin et al. (2007).

**Genus Dindicodes Prout, 1912**

**Nomenclature:**
- *Dindicodes albodavidaria* (Xue, 1992) (“comb. nov.”)
- *Dindicodes apicalis* (Moore, 1888)(“comb. rev.”)
- *Dindicodes apicalis hunana* (Xue, 1992) (“comb. nov.”)
*Dindicodes costiflavens* (Wehrli, 1933) (“comb. nov.”)

*Dindicodes davidaria* (Poujade, 1895) (“comb. rev.”)

*Dindicodes ectoxantha* (Wehrli, 1933) (“comb. nov.”)

*Dindicodes euclidiaria* (Oberthür, 1913) (“comb. rev.”)

*Dindicodes harutai* (Yazaki, 1992) (“comb. nov.”)

*Dindicodes harutai infuscatus* (Yazaki, 1992) (“comb. nov.”)

*Dindicodes leopardinata* (Moore, 1868) (“comb. rev.”)

*Dindicodes moelleri* (Warren, 1893) (“comb. rev.”)

**Notes:** The 11 species and subspecies listed here were formally transferred from the genus *Pachyodes* Guenée, [1858] to *Dindicodes* by Pitkin et al. (2007).

**Genus Dioscore** Warren, 1907

**Nomenclature:**

*Dioscore kirke* Lindt, Lennuk & Viidalepp, 2017 (“sp. nov.”)

*Dioscore vilu* Lindt, Lennuk & Viidalepp, 2017 (“sp. nov.”)

**Notes:** Two new species were described (Lindt et al. 2017a).

**Genus Dysphania** Hübner, [1819]

**Nomenclature:**

*Dysphania discalis aureolina* Inoue, 2007 (“ssp. nov.”)

**Notes:** One new species was described (Inoue 2007).

**Genus Epichrysodes** Han & Stüning, 2007 (“gen. nov.”)

**Nomenclature:**

*Epichrysodes tienmuensis* Han & Stüning, 2007 (“sp. nov.”)

**Notes:** *Epichrysodes* is currently a monotypic genus containing only the type species, *E. tienmuensis*; both the genus and the species were described by Han et al. (2007).

**Genus Epipristis** Meyrick, 1888

**Nomenclature:**

*Epipristis pullusa* Han & Xue, 2009 (“sp. nov.”)

*Epipristis roseus* Expósito & Han, 2009 (“sp. nov.”)

**Notes:** Two new species were described (Han et al. 2009a).
Genus *Episothalma* Swinhoe, 1893

**Nomenclature:**

*Episothalma cuspidata* Xue & Wang, 2009 (“sp. nov.”)

*Episothalma irrobustaria* Xue & Wang, 2009 (“sp. nov.”)

**Notes:** Two new species were described (Xue et al. 2009).

Genus *Eucyclodes* Warren, 1894

**Nomenclature:**

*Eucyclodes aphrodite* (Prout, 1933) (“stat. nov.”)

*Eucyclodes gavissima* (Walker, 1861)

*Eucyclodes hiyasata* Tautel, 2016 (“sp. nov.”)

*Eucyclodes insolita* Han & Zhang, 2019 (“sp. nov.”)

*Eucyclodes omeica* (Chu, 1981) (“comb. nov.”)

**Notes:** Two new species were described (Tautel 2016, Zhang et al. 2019). Han and Xue (2011a) elevated *Eucyclodes gavissima aphrodite* (Prout, 1933) from subspecies to species and transferred *Chloromachia omeica* Chu, 1981 to *Eucyclodes*. *Chloromachia* was already considered a junior synonym of *Eucyclodes* (Parsons et al. 1999), but Han and Xue (2011a) were the first to formally publish the new combination *E. omeica*.

Genus *Geometra* Linnaeus, 1758

**Nomenclature:**

*Geometra neovalida* Han, Galsworthy & Xue, 2009 (“sp. nov.”)

**Notes:** One new species was described (Han et al. 2009b).

Genus *Gnophosema* Prout, 1912

**Nomenclature:**

*Gnophosema isometra* (Warren, 1888)

*Gnophosema leucites* Wiltshire, 1980 (“stat. nov.”)

**Notes:** *Gnophosema isometra leucites* Wiltshire, 1980 was elevated from subspecies to species by Hausmann (2009).
Genus *Haruchlora* Viidalepp & Lindt, 2014 (“gen. nov.”)

**Nomenclature:**

*Haruchlora maesi* Viidalepp & Lindt, 2014 (“sp. nov.”)

**Notes:** *Haruchlora* is currently a monotypic genus containing only the type species, *H. maesi*; both the genus and the species were described by Viidalepp and Lindt (2014).

Genus *Hemistola* Warren, 1893

**Nomenclature:**

*Hemistola arcilinea* Han & Xue, 2009 (“sp. nov.”)

*Hemistola asymmetra* Han & Xue, 2009 (“sp. nov.”)

*Hemistola flavifimbria* Han & Xue, 2009 (“sp. nov.”)

*Hemistola flavitincta* Warren, 1897 (“comb. rev.”)

*Hemistola fui* Chang & Wu, 2013 (“sp. nov.”)

*Hemistola glauca* Han & Xue, 2009 (“sp. nov.”)

*Hemistola hanae* Wu, 2019 (“sp. nov.”)

*Hemistola liliana* (Swinhoe, 1892) (“comb. rev.”)

*Hemistola orbiculosoides* Han & Xue, 2009 (“sp. nov.”)

*Hemistola piceacola* Chang & Wu, 2013 (“sp. nov.”)

*Hemistola stueningi* Han & Xue, 2009 (“sp. nov.”)

*Hemistola taiwanensis* Chang & Wu, 2013 (“sp. nov.”)

*Hemistola viridimargo* Han & Xue, 2009 (“sp. nov.”)

**Notes:** Eleven new species were described (Han and Xue 2009, Chang and Wu 2013, Wu 2019). The species *Hemistola flavitincta* and *Hemistola liliana* were transferred to *Herochroma* Swinhoe, 1893 by Parsons et al. (1999). Pitkin et al. (2007) implied this was an editorial error and, citing a complete absence of *Herochroma* diagnostic characters, transferred both species back to *Hemistola*.

Genus *Hemithea* Duponchel, 1829

**Nomenclature:**

*Hemithea aestivaria* (Hübner, 1789)

*Hemithea aestivaria alboundulata* (Hedemann, 1879) (“stat. nov.”, followed by “syn. rev.”)

**Notes:** *Hemithea alboundulata* was a junior synonym of *H. aestivaria* until Leraut (2009) elevated it to subspecies. Müller et al. (2019) found the justification for this
taxonomic change to be too vague and, consequently, revived its status as a synonym of *H. aestivaria*.

**Genus *Herochroma* Swinhoe, 1893**

**Nomenclature:**

*Herochroma costata* Kirti, Goyal & Kaur, 2012 (nom. nud.)

*Herochroma subspoliata* (Prout, 1916)

*Herochroma xuthopletes* (Prout, 1934) (“stat. rev.”)

**Notes:** The name and locality of *Herochroma costata* were published in Kirti et al. (2012), but its description and diagnosis can only be found in the first author’s unpublished thesis. This species name is thus considered a nomen nudum.

*Herochroma subspoliata xuthopletes* (Prout, 1934) was elevated from subspecies to species by Pitkin et al. (2007).

**Genus *Hypobapta* Prout, 1912**

**Nomenclature:**

*Hypobapta tachyhalotaria* Hausmann & Sommerer, 2009 (“sp. nov.”)

**Notes:** One new species was described (Hausmann et al. 2009).

**Genus *Jodis* Hübner, [1823]**

**Nomenclature:**

*Jodis altitudinis* Tautel, 2016 (“sp. nov.”)

*Jodis argentea* Tautel, 2016 (“sp. nov.”)

*Jodis berde* Tautel, 2016 (“sp. nov.”)

*Jodis mystica* Tautel, 2016 (“sp. nov.”)

*Jodis omeiensis* (Chu, 1981) (“comb. nov.”)

*Jodis orientalis* Wehrli, 1923 (“stat. nov.”)

*Jodis angulata* Inoue, 1961 (“syn. nov.”)

*Jodis putata* (Linnaeus, 1758)

*Jodis sibuyana* Tautel, 2016 (“sp. nov.”)

*Jodis tomopunctata* Tautel, 2016 (“sp. nov.”)

**Notes:** Six new species were described (Tautel 2016).
Han and Xue (2011a) created the new combination *Jodis omeiensis*, stating that this species was transferred from the genus *Gelasma* Warren, 1893; however, *Gelasma* had been designated a junior synonym of *Maxates* Moore, [1887] by Holloway (1996). Despite this synonymy, the combination *Maxates omeiensis* (Chu, 1981) does not appear to have ever been published between 1996 and 2011.

Beljaev (2007) elevated *Jodis putata orientalis* Wehrli, 1923 from subspecies to species and subsequently synonymised it with *J. angulata*.

**Genus *Kuchleria* Hausmann, 1995**

**Nomenclature:**

*Kuchleria menadiara* Thierry-Mieg, 1893
*Kuchleria insignata* Hausmann, 1995 (“syn. nov.”, followed by “stat. rev.”)
*Kuchleria garciapitai* Expósito, 2006 (“syn. nov.”)

**Notes:** *Kuchleria garciapitai* was designated a junior synonym of *K. insignata* by Leraut (2009). In the same publication, Leraut (2009) claimed that *K. insignata* was a “synonym or subspecies” of *Kuchleria menadiara* Thierry-Mieg, 1893. Müller et al. (2019) treated this claim as a formal synonymy of *K. insignata* and *K. menadiara* and, subsequently, provided molecular and morphological evidence to justify elevating it back to species. *Kuchleria garciapitai* remains a junior synonym of *K. insignata*.

**Genus *Lindachlora* Viidalepp & Lindt, 2012 (“gen. nov.”)**

**Nomenclature:**

*Lindachlora flaccida* (Warren, 1909) (“comb. nov.”)
*Lindachlora tanystys* (Prout, 1931) (“comb. nov.”)

**Notes:** The genus *Lindachlora* currently contains two species, both of which were transferred from *Phrudocentra* Warren, 1895 by Viidalepp and Lindt (2012), with *L. flaccida* designated as the type species.

**Genus *Linguisaccus* Han, Galsworthy & Xue, 2012 (“gen. nov.”)**

**Nomenclature:**

*Linguisaccus minor* Han, Galsworthy & Xue, 2012 (“sp. nov.”)
*Linguisaccus subhyalina* (Warren, 1899) (“comb. nov.”)

**Notes:** *Comostolodes subhyalina* Warren, 1899 was transferred to *Comibaena* by Han and Xue (2011a) and then designated as the type species of the new genus *Linguisaccus* by Han et al. (2012).
Genus *Lissocentra* Viidalepp & Lindt, 2012 ("gen. nov.")

**Nomenclature:**

*Lissocentra hydatodes* (Warren, 1906) ("comb. nov.")

*Lissocentra vitiosaria* (Dognin, 1912) ("comb. nov.")

**Notes:** The recently described genus *Lissocentra* currently contains two species, both of which were transferred from *Phrudocentra* by Viidalepp and Lindt (2012), with *L. hydatodes* designated as the type species.

Genus *Lissochlora* Warren, 1900

**Nomenclature:**

*Lissochlora hinojosae* Lindt & Viidalepp, 2014 ("sp. nov.")

*Lissochlora janamariae* Lindt & Viidalepp, 2014 ("sp. nov.")

*Lissochlora klausi* Viidalepp & Lindt, 2019 ("sp. nov.")

*Lissochlora niveiceps* (Prout, 1912) ("comb. nov.")

*Lissochlora senescens* (Prout, 1917) ("comb. nov.")

**Notes:** Three new species were described (Lindt and Viidalepp 2014, Viidalepp and Lindt 2019a). One of those species, *Lissochlora hinojosae*, was described in Lindt et al. (2014) with the specific epithet spelled ‘*hinoyosae*’, the first time it appears in both the English and Spanish versions of the abstract. However, it is spelled ‘*hinojosae*’ the first time it appears in the main text. The etymological remarks provided in Lindt et al. (2014) confirm that ‘*hinojosae*’ is the intended spelling (cf. § 24.2; 32.2.1.; 32.5 Code ICZN).

*Lissochlora niveiceps* and *L. senescens* were transferred from *Phrudocentra* by Viidalepp and Lindt (2012).

Genus *Lophophelma* Prout, 1912

**Nomenclature:**

*Lophophelma albapex* (Inoue, 1988) ("comb. nov.")

*Lophophelma costistrigaria* (Moore, 1868) ("comb. rev.")

*Lophophelma iterans* (Prout, 1926) ("comb. nov.")

*Lophophelma pingbiana* (Chu, 1981) ("comb. nov.")

*Lophophelma taiwana* (Wileman, 1912) ("comb. rev.")

*Lophophelma tanatoraja* Sommerer, Stüning & Tautel, 2015 ("sp. nov.")

*Lophophelma varicoloraria* (Moore, 1868) ("comb. rev.")
**Notes:** One new species was described (Sommerer et al. 2015). Pitkin et al. (2007) transferred six species to *Lophophelma*: five from the genus *Pachyodes* (*Lophophelma albapex*, *L. costistrigaria*, *L. iterans*, *L. taiwana*, *L. varicoloraria*) and one from the genus *Terpna* Herrich-Schäffer, 1854 (*Lophophelma pingbiana*).

**Genus Loxochila Butler, 1881 (“stat. rev.”)**

**Nomenclature:**

*Loxochila burmensis* (Han, Galsworthy & Xue, 2009) (“sp. nov.”)

*Loxochila fragilis* (Oberthür, 1916) (“comb. nov.”)

*Loxochila kina* (Swinhoe, 1893) (“comb. nov.”)

*Loxochila sinoisaria* (Oberthür, 1916) (“comb. nov.”)

*Loxochila smaragdus* (Butler, 1880) (“comb. rev.”)

*Loxochila tibeta* (Chu, 1982) (“comb. nov.”)

**Notes:** One new species was described (Han et al. 2009b). *Loxochila* was treated as a junior synonym of *Geometra* in Parsons et al. (1999) and Scoble and Hausmann (2007). Han et al. (2009b) retained this classification in their revision of *Geometra*, which divided the genus into two species groups. The type species of *Loxochila*, at the time named *Geometra smaragdus* (Butler), served as the eponymous taxon of the *smaragdus* species group. The molecular phylogeny of Ban et al. (2018) demonstrated that the *smaragdus* group is a strongly-supported clade that also contains one species from a different genus (*Tanaorhinus kina* Swinhoe). Ban et al. (2018) consequently reinstated the generic status of *Loxochila* and transferred the species in the *smaragdus* group, including *T. kina*, to this genus.

**Genus Maxates Moore, [1887]**

**Nomenclature:**

*Maxates acyra* (Prout, 1935) (“comb. nov.”)

*Maxates dissimulata* (Walker, 1861)

*Maxates semiprotrusa* (Inoue, 1989) (“syn. nov.”)

*Maxates elegante* Tautel, 2015 (“sp. nov.”)

*Maxates persona* Tautel, 2016 (“sp. nov.”)

*Maxates szechwanensis* (Chu, 1981) (“comb. nov.”)

**Notes:** Two new species were described (Tautel 2015, Tautel 2016). *Maxates acyra* was transferred from *Hemistola* by Han and Xue (2009) and *M. szechwanensis* was transferred from *Jodis* by Han and Xue (2011a). Han and Xue (2011a) also synonymised *M. semiprotrusa* with *M. dissimulata.*
Genus *Metaterpna* Yazaki, 1992

**Nomenclature:**

*Metaterpna batangensis* Han & Stüning, 2016 ("sp. nov.")

**Notes:** One new species was described (Jiang et al. 2016).

Genus *Microloxia* Warren, 1893

**Nomenclature:**

*Microloxia aistleitneri* Hausmann, 2009 ("sp. nov.")

*Microloxia chlorisoides* (Prout, 1912) ("comb. nov.")

*Microloxia herbaria* (Hübner, 1813)

*Microloxia herbaria virideciliata* (Bubacek, 1926) ("syn. nov.", followed by "stat. rev.")

**Notes:** One new species was described (Hausmann 2009).

After synonymising *Aoshakuna* and *Nipponogelasma*, Beljaev (2007) transferred *Nipponogelasma chlorisoides* (Prout, 1913) to *Microloxia*.

Leraut (2009) synonymised *Microloxia herbaria virideciliata* with *M. h. herbaria* (Hübner, 1813). Müller et al. (2019) cited molecular and morphological evidence to justify elevating *M. h. virideciliata* back to subspecies.

Genus *Nemoria* Hübner, 1818

**Nomenclature:**

"*Nemoria* erina* (Dognin, 1896)

"*Nemoria* nigrisquama* (Dognin, 1904)

*Nemoria yellowrosea* Koçak & Kemal, 2008 ("nom. nov.")

*Nemoria albilineata* Cassino, 1927

**Notes:** The molecular phylogeny of Murillo-Ramos et al. (2019) indicates that the current concept of *Nemoria* Hübner is polyphyletic and that *N. erina* (Dognin) and *N. nigrisquama* (Dognin) do not belong in *Nemoria*, though there is insufficient evidence to describe new genera or create new combinations for these two species. Brehm et al. (2019) consequently suggested that their generic names are listed in quotation marks, pending further taxonomic study.

In her revision of Neotropical *Nemoria*, Pitkin (1993) transferred *Lissochlora albilineata* Warren, 1909 to the genus *Nemoria*. This new combination, *Nemoria albilineata* (Warren, 1909) consequently became a senior homonym of the Texan species *Nemoria albilineata* Cassino, 1927. This homonymy went unnoticed for over a decade, until Koçak and Kemal (2008) designated a replacement name for the junior homonym.
Genus *Neochloroglyphica* Han & Skou, 2019 (“gen. nov.”)

**Nomenclature:**

*Neochloroglyphica perbella* Han & Skou, 2019 (“sp. nov.”)

**Notes:** *Neochloroglyphica* is currently a monotypic genus containing only the type species, *N. perbella*; both the genus and the species were described by Han et al. (2019).

Genus *Neohipparchus* Inoue, 1944

**Nomenclature:**

*Neohipparchus maculata* (Warren, 1897)

*Chloroglyphica orhanti* Herbulot, 1994 (“syn. nov.”)

**Notes:** *Chloroglyphica orhanti* was synonymised with *Neohipparchus maculata* by Han and Xue (2011a).

Genus *Neromia* Staudinger, 1898

**Nomenclature:**

*Neromia integrata* Hausmann, 2009 (“sp. nov.”)

**Notes:** One new species was described (Hausmann and Hebert 2009).

Genus *Oenospila* Swinhoe, 1892

**Nomenclature:**

*Oenospila sacculstrix* Kirti, Goyal & Kaur, 2012 (nom. nud.)

**Notes:** The name and locality of this species were formally published in Kirti et al. (2012), but its description and diagnosis can only be found in the first author’s unpublished thesis. This species name is thus considered a nomen nudum.

Genus *Oospila* Warren, 1897

**Nomenclature:**

*Oospila absaloni* Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)

*Oospila agnetaforslundae* Lindt, Hausmann & Viidalepp, 2018 (“nom. nov.”)

*Oospila bifida* Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)

*Oospila brehmi* Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)

*Oospila bulava* Lindt & Viidalepp, 2015 (“sp. nov.”)

*Oospila cristae* Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)
Oospila ehakernae Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)
Oospila falcata Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)
Oospila imula Dognin, 1911 (“stat. nov.”)
Oospila loreenae Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)
Oospila moseri Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)
Oospila pallidaria boliviensis Lindt, Hausmann & Viidalepp, 2018 (“ssp. nov.”)
Oospila pipa Lindt, Hausmann & Viidalepp, 2018 (“sp. nov.”)
Oospila poirieri Lévêque & Viidalepp, 2015 (“sp. nov.”)
Oospila similiplaga Warren, 1900 (“stat. nov.”)
Oospila similiplaga bolarpata Lindt, Hausmann & Viidalepp, 2018 (“ssp. nov.”)

Notes: Eleven species and two subspecies were described (Lévêque and Viidalepp 2015, Lindt and Viidalepp 2015, Lindt et al. 2018). Lindt et al. (2018) designated Oospila agnetaforslundae as a replacement name for Oospila marginata (Schaus, 1912), which had previously been erroneously synonymised with Oospila permagna (Warren, 1909) by Cook and Scoble (1995). The replacement name was necessary because O. marginata (Schaus, 1912) is a junior secondary homonym of O. marginata Warren, 1897. Lindt et al. (2018) also raised O. imula from synonymy with O. miccularia Guenée, [1858] and raised O. similiplaga from synonymy with O. arpata (Schaus, 1897).

Genus Ornithospila Warren, 1894

Nomenclature:
Ornithospila explorator Tautel, 2015 (“sp. nov.”)

Notes: One new species was described (Tautel 2015).

Genus Orothalassodes Holloway, 1996

Nomenclature:
Orothalassodes leucospilota (Moore, [1887])
Thalassodes albomaculata Hampson, 1895
Orothalassodes albomaculata Kirti, Goyal & Kaur, 2012

Notes: Kirti et al. (2012) published the name Orothalassodes albomaculata as a new combination for Thalassodes albomaculata. However, T. albomaculata had already been synonymised with Thalassodes leucospilota Moore by Hampson (1896), which was then transferred to Orothalassodes by Holloway (1996). Thus, the current valid name for this species is still Orothalassodes leucospilota.
Genus *Pachyodes* Guenée, [1858]

**Nomenclature:**

*Pachyodes jianfengensis* Han & Xue, 2008 (“sp. nov.”)  
*Pachyodes novata* Han & Xue, 2008 (“sp. nov.”)

**Notes:** Two new species were described (Han and Xue 2008).

Genus *Paramaxates* Warren, 1894

**Nomenclature:**

*Paramaxates fournieri* Tautel, 2016 (“sp. nov.”)  
*Paramaxates vagata* (Walker, 1861)  
*Paramaxates hainana* Chu, 1981 (“syn. nov.”)

**Notes:** One new species was described (Tautel 2016). *Paramaxates hainana* was synonymised with *P. vagata* by Han and Xue (2011a).

Genus *Paromphacodes* Warren, 1897

**Nomenclature:**

*Paromphacodes alpha* Lindt, Tasane, Ūnap & Viidalepp, 2017 (“sp. nov.”)  
*Paromphacodes alticola* Lindt, Tasane, Ūnap & Viidalepp, 2017 (“sp. nov.”)  
*Paromphacodes onae* Lindt, Tasane, Ūnap & Viidalepp, 2017 (“sp. nov.”)  
*Paromphacodes spina* Lindt, Tasane, Ūnap & Viidalepp, 2017 (“sp. nov.”)  
*Paromphacodes summita* Lindt, Tasane, Ūnap & Viidalepp, 2017 (“sp. nov.”)

**Notes:** Five new species were described (Lindt et al. 2017b).

Genus *Pelagodes* Holloway, 1996

**Nomenclature:**

*Pelagodes bellula* Han & Xue, 2011 (“sp. nov.”)  
*Pelagodes cancriformis* Viidalepp, Han & Lindt, 2012 (“sp. nov.”)  
*Pelagodes paraveraria* Han & Xue, 2011 (“sp. nov.”)  
*Pelagodes simplvalvae* Han & Xue, 2011 (“sp. nov.”)  
*Pelagodes sinuspinae* Han & Xue, 2011 (“sp. nov.”)

**Notes:** Five new species were described (Han and Xue 2011b, Viidalepp et al. 2012).
Genus *Prasinocyma* Warren, 1897

Nomenclature:

*Prasinocyma amharensis* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma angolica pseudopedicata* Hausmann, Sciarretta & Parisi, 2016 ("ssp. nov.")

*Prasinocyma angolica yemenicola* Hausmann & Wildfeuer, 2017 ("ssp. nov.")

*Prasinocyma angulifera* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma aquamarina* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma batesi distans* Hausmann, Sciarretta & Parisi, 2016 ("ssp. nov.")

*Prasinocyma baumgaertneri* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma beryllaria* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma bongaensis* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma camerunalta* (Herbulot, 1986) ("comb. nov.")

*Prasinocyma discipuncta* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma fallax* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma fusca* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma gemmifera* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma getachewi* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma immaculata* (Thunberg, 1784)

*Prasinocyma immaculata thiaucourti* Herbulot, 1993 ("stat. nov.")

*Prasinocyma levaneorum* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma lutulenta* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma magic* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma monikae* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma nereis* Townsend, 1952 ("comb. rev.")

*Prasinocyma pedicata aethiopica* Hausmann, Sciarretta & Parisi, 2016 ("ssp. nov.")

*Prasinocyma robusta* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma saba* Hausmann & Wildfeuer, 2017 ("sp. nov.")

*Prasinocyma septentrionalis* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma shoa yabellensis* Hausmann, Sciarretta & Parisi, 2016 ("ssp. nov.")

*Prasinocyma stefani* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")

*Prasinocyma trematerrai* Hausmann, Sciarretta & Parisi, 2016 ("sp. nov.")
Prasinocyma trematerraisimienensis Hausmann, Sciarretta & Parisi, 2016 (“ssp. nov.”)

Notes: Twenty new species and six new subspecies were described (Hausmann et al. 2016, Hausmann and Wildfeuer 2017). Hausmann et al. (2016) transferred Thalassodes camerunalta Herbulot, 1986 and Eretmopus nereis (Townsend, 1952) to the genus Prasinocyma. They also synonymised P. unipuncta with P. immaculata and changed the status of P. thiaucourti Herbulot, 1993 from a species to a subspecies of P. immaculata.

Genus Protuliocnemis Holloway, 1996

Nomenclature:

Protuliocnemis candida Han, Galsworthy & Xue, 2012 (“sp. nov.”)

Protuliocnemis dissimilis Han, Galsworthy & Xue, 2012 (“sp. nov.”)

Protuliocnemis falcipennis (Yazaki, 1991) (“comb. nov.”)

Notes: Two new species were described (Han et al. 2012). Protuliocnemis falcipennis was transferred from the genus Comibaena by Han and Xue (2011a).

Genus Pseudepisothalma Han, 2009 (“gen. nov.”)

Nomenclature:

Pseudepisothalma ocellata (Swinhoe, 1893) (“comb. nov.”)

Notes: Pseudepisothalma is currently a monotypic genus containing only the type species, P. ocellata, which was transferred from the genus Episothalma. The new genus description and new combination were presented in Xue et al. (2009), though only the third author (Han) is credited with authorship.

Genus Psilotagma Warren, 1894

Nomenclature:

Psilotagma pictaria (Moore, 1888) (“comb. nov.”)

Notes: Psilotagma pictaria was transferred from the genus Pachyodes by Pitkin et al. (2007).

Genus Pyrochlora Warren, 1895

Nomenclature:

Pyrochlora kuklase Viidalepp, 2009 (“sp. nov.”)

Pyrochlora motilonia Viidalepp, 2009 (“sp. nov.”)

Pyrochlora vogli Viidalepp, 2009 (“sp. nov.”)
Notes: Three new species were described (Viidalepp 2009).

Genus **Rhanidopsis** West, 1930

**Nomenclature:**

*Rhanidopsis kogeri* Viidalepp & Lindt, 2010 (“sp. nov.”)

**Notes:** One new species was described (Viidalepp and Lindt 2010).

Genus **Rhuma** Walker, 1860

**Nomenclature:**

*Sterictopsis* Warren, 1898 (“syn. nov.”)

*Oxyphanes* Turner, 1936 (“syn. nov.”)

*Rhuma argyraspis* (Lower, 1893) (“comb. nov.”)

*Rhuma divergens* (Goldfinch, 1929) (“comb. nov.”)

*Rhuma thiobapta* (Turner, 1936)(“comb. nov.”)

**Notes:** Pitkin et al. (2007) designated *Sterictopsis* and *Oxyphanes* as junior synonyms of *Rhuma* and consequently transferred *S. argyraspis* (Lower, 1893), *S. divergens* Goldfinch, 1929 and *O. thiobapta* Turner, 1936 to this genus.

Genus **Tachyphyle** Butler, 1881

**Nomenclature:**

*Tachyphyle nielseni* Viidalepp & Lindt, 2017 (“sp. nov.”)

*Tachyphyle selini* Viidalepp & Lindt, 2017 (“sp. nov.”)

**Notes:** Two new species were described (Viidalepp and Lindt 2017).

Genus **Tanaorhinus** Butler, 1879

**Nomenclature:**

*Tanaorhinus baruensis* Orhant, 2014 (“sp. nov.”)

*Tanaorhinus guitinguensis* Tautel, 2014 (“sp. nov.”)

*Tanaorhinus sultan* Tautel, 2014 (“sp. nov.”)

**Notes:** Three new species were described (Orhant 2014, Tautel 2014).

Genus **Telotheta** Warren, 1900

**Nomenclature:**

*Telotheta fresei* Lindt & Viidalepp, 2014 (“sp. nov.”)
Telotheta unoi Lindt & Viidalepp, 2014 ("sp. nov.")

**Notes:** Two new species were described (Lindt and Viidalepp 2014).

### Genus Thalera Hübner, [1823]

**Nomenclature:**

*Hethemia* Ferguson, 1969 ("syn. nov.")

*Thalera pistasciaria* (Guenée, 1858) ("comb. nov.")

**Notes:** *Hethemia* sensu Ferguson was a monotypic genus, containing only the type species *H. pistasciaria*. Ban et al. (2018) provided morphological and molecular evidence to justify the designation of *Hethemia* as a junior synonym of *Thalera*, creating the new combination *T. pistasciaria*.

### Genus Thetidia Boisduval, 1840

**Nomenclature:**

*Thetidia chlorophyllaria* (Hedemann, 1879)

*Thetidia pekingensis* (Chu, 1981) ("comb. nov.", followed by "syn. nov.")

**Notes:** The name *Thetidia pekingensis* (Chu, 1981) was first published in Han and Xue (2011a); it was not designated a new combination, but since *Euchloris* Hübner, [1823] was already known to be a synonym of *Thetidia* (Parsons et al. 1999), Han and Xue (2011a) were presumably transferring *Euchloris pekingensis* Chu, 1981 to *Thetidia*. This was confirmed by Han et al. (2012), who subsequently synonymised *T. pekingensis* with *T. chlorophyllaria*.

### Genus Timandromorpha Inoue, 1944

**Nomenclature:**

*Timandromorpha inouei* Stüning & Yazaki, 2008 ("sp. nov.")

*Timandromorpha pinratanai* Stüning & Yazaki, 2008 ("sp. nov.")

*Timandromorpha wangi* Stüning & Yazaki, 2008 ("sp. nov.")

*Timandromorpha xuedayongi* Orhant, 2013 ("sp. nov.")

**Notes:** Four new species were described (Stüning and Yazaki 2008, Orhant 2013).

### Genus Vallichlora Viidalepp & Lindt, 2019 ("gen. nov.")

**Nomenclature:**

*Vallichlora rara* Viidalepp & Lindt, 2019 ("sp. nov.")

*Vallichlora selva* Viidalepp & Lindt, 2019 ("sp. nov.")
Notes: Two new species were described (Viidalepp and Lindt 2019b).

Genus *Xenozancla* Warren, 1893

Nomenclature:

*Yinchie* Yang, 1978 (“syn. nov.”)

*Xenozancla versicolor* Warren, 1893

*Yinchie zaohui* Yang, 1978 (“syn. nov.”)

Notes: Han et al. (2008) synonymised *Yinchie zaohui* with *Xenozancla versicolor*. Since *Y. zaohui* was the type species of its genus, *Yinchie* was consequently designated a junior synonym of *Xenozancla*.

Other species affiliated with Geometrinae

*Pseudobiston pinratanai* Inoue, 1994

Notes: *Pseudobiston pinratanai* Inoue, 1994, was classified as a geometrine in Scoble and Hausmann (2007) but was recently transferred to the new family Pseudobistonidae by Rajaei et al. (2015).

*Cerura melanoglypta* (Lower, 1905)

Notes: One species in the Scoble and Hausmann (2007) checklist, *Cerura melanoglypta* (Lower, 1905), is classified as a geometrine (Ollerenshaw 2012), but has never formally been transferred from the notodontid genus *Cerura* Schrank, 1802. We agree that this species should eventually be assigned to a genus in Geometrinae, but it is technically not in Geometrinae at this time.

Discussion

In summation, nine new genera, 128 new species and ten new subspecies of emerald moths have been described since the publication of Scoble and Hausmann (2007), along with over 80 new genus- and species-group changes within subfamily Geometrinae. Since 2007, the known species richness of Geometrinae has increased by ~4.5%, from 2,529 species (Scoble and Hausmann 2007) to 2,643 species.

Acknowledgements

We thank Charles Covell, Jennifer Gillett-Kaufman, Axel Hausmann, Nicholas Homziak and Hossein Rajaei for their discussions and comments on earlier drafts of the manuscript.
References

• Ban X, Jiang N, Cheng R, Xue D, Han H (2018) Tribal classification and phylogeny of Geometrinae (Lepidoptera: Geometridae) inferred from seven gene regions. Zoological Journal of the Linnean Society 184: 653-672. https://doi.org/10.1093/zoolinnean/zly013

• Beljaev E (2007) Taxonomic changes in the emerald moths (Lepidoptera: Geometridae, Geometrinae) of East Asia, with notes on the systematics and phylogeny of Hemitheini. Zootaxa 1584: 55-68. https://doi.org/10.11646/zootaxa.1584.1.2

• Brehm G, Murillo-Ramos L, Sihvonen P, Hausmann A, Schmidt B, Öunap E, Moser A, Mörtter R, Bolt D, Bodner F, Lindt A, Parra L, Wahlberg N (2019) New World geometrid moths (Lepidoptera: Geometridae): Molecular phylogeny, biogeography, taxonomic updates and description of 11 new tribes. Arthropod Systematics & Phylogeny 77: 457-486. https://doi.org/10.26049/ASP77-3-2019-5

• Canfield M, Greene E, Moreau C, Chen N, Pierce N (2008) Exploring phenotypic plasticity and biogeography in emerald moths: A phylogeny of the genus Nemoria (Lepidoptera: Geometridae). Molecular Phylogenetics and Evolution 49 (2): 477-487. https://doi.org/10.1016/j.ympev.2008.07.003

• Chang W, Wu S (2013) Review of the genus Hemistola Warren, 1893 in Taiwan with notes on an unusual conifer-feeding larva and descriptions of three new species (Lepidoptera, Geometridae, Geometrinae). Zootaxa 3741 (4): 538-550. https://doi.org/10.11646/zootaxa.3741.4.5

• Cook M, Scoble M (1995) Revision of the neotropical genus Oospila Warren (Lepidoptera: Geometridae). Bulletin of the Natural History Museum. Entomology Series 64: 1-115.

• De Prins J, De Prins W (2019) Afromoths, online database of Afrotropical moth species (Lepidoptera). http://www.afromoths.net. Accessed on: 2019-9-30.

• Goyal T, Kirti JS, Saxena A (2018) Taxonomy of genus Agathia Guenée (Lepidoptera: Geometridae) with description of a new species from western ghats, India. Indian Journal of Entomology 80 (3): 951-959. https://doi.org/10.5958/0974-8172.2018.00144.X

• Greene E (1989) A diet-induced developmental polymorphism in a caterpillar. Science 243 (4891): 643-646. https://doi.org/10.1126/science.243.4891.643

• Hampson G (1896) The fauna of British India, including Ceylon and Burma. Moths. Vol. IV. Taylor and Francis, London, 594 pp.

• Han H, Li H, Xue D (2006) Revision of Chlororithra Butler, 1889 (Lepidoptera, Geometridae, Geometrinae). Zootaxa 1221 (1): 29-39. https://doi.org/10.11646/zootaxa.1221.1.4

• Han H, Stüning D, Xue D (2007) Epichrysodes gen. n., a new genus of Geometrinae from the West Tianmu mountains, China (Lepidoptera, Geometridae), with description of a new species. Mitteilungen aus dem Museum für Naturkunde in Berlin – Deutsche Entomologische Zeitschrift 54 (1): 127-135. https://doi.org/10.1002/mnnd.200700012

• Han H, Xue D (2008) A taxonomic review of Pachyodes Guenée, 1858, with descriptions of two new species (Lepidoptera: Geometridae, Geometrinae). Zootaxa 1759 (1): 51-68. https://doi.org/10.11646/zootaxa.1759.1.3
• Han H, Li J, Xue D (2008) Revision of the genus *Xenozancla* Warren, 1893 (Lepidoptera: Geometridae: Geometrinae) with an analysis of its distribution pattern. Acta Entomologica Sinica 51: 315-321.

• Han H, Xue D (2009) Taxonomic review of *Hemistola* Warren, 1893 from China, with descriptions of seven new species (Lepidoptera: Geometridae, Geometrinae). Entomological Science 12 (4): 382-410. https://doi.org/10.1111/j.1479-8298.2009.00341.x

• Han H, Expósito-Hermosa A, Xue D (2009a) A taxonomic study of *Epipristis* Meyrick, 1888 from China, with descriptions of two new species (Lepidoptera: Geometridae, Geometrinae). Zootaxa 2263 (1): 31-41. https://doi.org/10.11646/zootaxa.2263.1.3

• Han H, Galsworthy AC, Xue D (2009b) A survey of the genus *Geometra* Linnaeus (Lepidoptera, Geometridae, Geometrinae). Journal of Natural History 43: 885-922. https://doi.org/10.1080/00222930802702472

• Han H, Xue D (2011a) Fauna Sinica (Insecta Vol. 54. Lepidoptera, Geometridae, Geometrinae). Science Press, Beijing, 864 pp.

• Han H, Xue D (2011b) *Thalassodes* and related taxa of emerald moths in China (Geometridae, Geometrinae). Zootaxa 3019 (1): 26-50. https://doi.org/10.11646/zootaxa.3019.1.2

• Han H, Galsworthy A, Xue D (2012) The Comibaenini of China (Geometridae: Geometrinae), with a review of the tribe. Zoological Journal of the Linnean Society 165 (4): 723-772. https://doi.org/10.1111/j.1096-3642.2012.00826.x

• Han H, Skou P, Cheng R (2019) *Neochloroglyphica*, a new genus of Geometrinae from China (Lepidoptera, Geometridae), with description of a new species. Zootaxa 4571 (1): 99-110. https://doi.org/10.11646/zootaxa.4571.1.6

• Hausmann A (2009) New and interesting geometrid moths from the Cape Verde Islands (Lepidoptera: Geometridae). SHILAP Revista de Lepidopterología 37: 241-247.

• Hausmann A, Hebert P (2009) Order Lepidoptera, family Geometridae (Part 2). The Geometridae of the UAE revised in the light of mtDNA data. Arthropod Fauna of the UAE 2: 468-479.

• Hausmann A, Sommerer M, Rougerie R, Hebert P (2009) *Hypobapta tachyhalotaria* spec. nov from Tasmania – an example of a new species revealed by DNA barcoding. Spixiana 32: 161-166.

• Hausmann A, Parisi F, Sciarretta A (2014) The geometrid moths of Ethiopia I: tribes Pseudoterpnini and Comibaenini (Lepidoptera: Geometridae, Geometrinae). Zootaxa 3768 (4): 460-468. https://doi.org/10.11646/zootaxa.3768.4.4

• Hausmann A, Sciarretta A, Parisi F (2016) The Geometrinae of Ethiopia II: Tribus Hemistolini, genus *Prasinocyma* (Lepidoptera: Geometridae, Geometrinae). Zootaxa 4065: 1-63. https://doi.org/10.11646/zootaxa.4065.1.1

• Hausmann A, Wildfeuer J (2017) Nine new emerald species for the fauna of Yemen, with description of two new taxa in the genus *Prasinocyma*. Spixiana 40: 171-180.

• Holloway J (1996) The moths of Borneo: Family Geometridae, subfamilies Oenochrominae, Desmobathrinae and Geometrinae. Malayan Nature Journal 49: 147-326.

• Inoue H (2007) A new subspecies of *Dysphania discalis* (Walker) (Geometridae, Geometrinae) from the Lingga Islands. Lepidoptera Science 58: 4-6.
• Jiang N, Stünig D, Xue D, Han H (2016) Revision of the genus *Metaterpna* Yazaki, 1992 (Lepidoptera, Geometridae, Geometrinae), with description of a new species from China. Zootaxa 4200 (4): 501-514. https://doi.org/10.11646/zootaxa.4200.4.3

• Karisch T (2010) Geometridae der Expeditionen H. Hoppes nach Bioko 1. Teil: Desmobathriniae, Geometrinae (Lepidoptera, Geometridae). Lambillionea 110: 344-352.

• Kirti J, Goyal T, Kaur M (2012) An inventory of family Geometridae (Lepidoptera) from western ghats of India. Journal of Entomological Research 36: 83-94.

• Kitching I, Rougerie R, Zwick A, Hamilton C, St Laurent R, Naumann S, Ballesteros Mejia L, Kawahara A (2018) A global checklist of the Bombycoidea (Insecta: Lepidoptera). Biodiversity Data Journal 6: e22236. https://doi.org/10.3897/bdj.6.e22236

• Koçak A, Kemal M (2008) Some nomenclatural notes on the Geometridae of the world (Lepidoptera). Miscellaneous papers - Centre for Entomological Studies 138: 8-9.

• Leraut P (2009) Moths of Europe-Volume 2: Geometrid moths. NAP Editions, Paris, 808 pp.

• Lévêque A, Viidalepp J (2015) Description of a new *Oospila* Warren, 1897, from French Guiana (Lepidoptera Geometridae Geometrinae Lophochoristini). Antenor 2 (1): 142-147. URL: http://zoobank.org/42A775F5-E113-435C-9A0F-B8E7A5A65A3

• Lindt A, Viidalepp J (2014) Two new emerald geometrid species of *Telotheta* Warren from Ecuador and Bolivia (Lepidoptera: Geometridae, Geometrinae, Lophochoristini). Biodiversity Data Journal 2: e1158. https://doi.org/10.3897/bdj.2.e1158

• Lindt A, Tasane T, Viidalepp J (2014) Dos nuevas especies de polillas esmeraldas de Ecuador, Perú y Bolivia (Lepidoptera: Geometridae, Geometrinae). SHILAP Revista de Lepidopterología 42: 151-156.

• Lindt A, Viidalepp J (2015) *Oospila bulava*, a new emerald geometrid moth from South America (Lepidoptera, Geometridae, Geometrinae). Zootaxa 4058 (1): 142-144. https://doi.org/10.11646/zootaxa.4058.1.11

• Lindt A, Lennuk L, Viidalepp J (2017a) The genus *Dioscore* Warren, 1907: two new species and analysis of characters spread (Lepidoptera: Geometridae: Geometrinae). Journal of Insect Biodiversity 5 (16): 1-15. https://doi.org/10.12976/jib/2017.5.16

• Lindt A, Tasane T, Ūnup E, Viidalepp J (2017b) Five new species of the genus *Paromphacodes* (Lepidoptera: Geometridae: Geometrinae) from High Andes in Ecuador. Zootaxa 4303 (3): 395-406. https://doi.org/10.11646/zootaxa.4303.3.5

• Lindt A, Hausmann A, Viidalepp J (2018) Review of some species groups of the genus *Oospila* Warren, with descriptions of nine new species (Lepidoptera: Geometridae: Geometrinae). Zootaxa 4497 (2): 151-194. https://doi.org/10.11646/zootaxa.4497.2.1

• Müller B, Erlacher S, Hausmann A, Rajaei H, Sihvonen P, Skou P (2019) Volume 6. Part 1. Subfamily Ennominae II: (Boarmiini, Gnophini, additions to previous volumes). Brill, Leiden, 906 pp.

• Murillo-Ramos L, Brehm G, Sihvonen P, Hausmann A, Holm S, Reza Ghanavi H, Ūnup E, Truuverk A, Staude H, Friedrich E, Tammaru T, Wahlberg N (2019) A comprehensive molecular phylogeny of Geometridae (Lepidoptera) with a focus on enigmatic small subfamilies. PeerJ 7: e7386. https://doi.org/10.7717/peerj.7386

• Oberthür C (1916) Révision iconographique des espèces de Phalénites (Geometra, Linné). Études de Lépidoptérologie Comparée 12: 67-176.

• Ollerenshaw J (2012) The Global Lepidoptera Names Index (LepIndex). https://http://www.nhm.ac.uk/our-science/data/lepidindex/detail/?taxonno=246329. Accessed on: 2019-10-29.
• Orhant G (2013) Sept nouveaux hétérocères asiatiques (Lepidoptera, Noctuidae, Geometridae). Lambillionea 113: 30-36.
• Orhant G (2014) Contribution à la connaissance du genre Tanaorhinus - Description d’une nouvelle espèce des Moluques. Découverte et description du mâle de Tanaorhinus tibeta Chu, 1982 (Lepidoptera, Geometridae, Geometrinae). Bulletin de la Société Entomologique de Mulhouse 70: 59-64.
• Õunap E, Viidalepp J (2009) Description of Crypsiphona tasmanica sp. nov. (Lepidoptera: Geometridae: Geometrinae), with notes on limitations in using DNA barcodes for delimiting species. Australian Journal of Entomology 48: 113-124. https://doi.org/10.1111/j.1440-6055.2009.00695.x
• Parsons M, Scoble M, Honey M, Pitkin L, Pitkin B (1999) Geometrid moths of the world: a catalogue (Lepidoptera, Geometridae). CSIRO, Clayton North, Victoria, Australia, 1304 pp.
• Pitkin L (1993) Neotropical emerald moths of the genera Nemoria, Lissochlora and Chavannia, with particular reference to the species of Costa Rica (Lepidoptera: Geometridae, Geometrinae). Bulletin of the Natural History Museum (Entomology) 62: 39-159.
• Pitkin L, Han H, James S (2007) Moths of the tribe Pseudoterpnini (Geometridae: Geometrinae): a review of the genera. Zoological Journal of the Linnean Society 150 (2): 343-412. https://doi.org/10.1111/j.1096-3642.2007.00287.x
• Rajaei H, Greve C, Letsch H, Stüning D, Wahlberg N, Minet J, Misof B (2015) Advances in Geometroidea phylogeny, with characterization of a new family based on Pseudobiston pinratanai (Lepidoptera, Glossata). Zoologica Scripta 44 (4): 418-436. https://doi.org/10.1111/zsc.12108
• Scoble M, Hausmann A (2007) Online list of valid and available names of the Geometridae of the World. http://www.lepbarcoding.org/geometridae/species_checklists.php. Accessed on: 2019-11-01.
• Sommerer M, Stüning D, Tautel C (2015) Lophophelma tanatoraja spec. nov., a new geometrid moth from Sulawesi near Lophophelma luteipes Felder & Rogenhofer, 1875 (Geometridae, Geometrinae). Tinea 23: 108-114.
• Stüning D, Yazaki K (2008) Three new species of the genus Timandromorpha Inoue, 1944 (Lepidoptera, Geometridae, Geometrinae) from Southeast Asia. Tinea 20: 253-263.
• Tautel C (2014) Deux nouveaux Tanaorhinus pour la Wallacea (Lepidoptera Geometridae Geometrinae). Antenor 1: 191-198.
• Tautel C (2015) Nouveaux Geometridae des Philippines des genres Comostola, Ornithosphila et Maxates. Antenor 2: 122-134.
• Tautel C (2016) Nouvelles espèces de géomètres du Cambodge et des Philippines (Lepidoptera, Geometridae, Geometrinae). Bulletin de la Société Entomologique de France 121: 491-506.
• Tautel C, Barrion-Dupo A-L (2017) Nouvelles espèces de Geometrinae des Philippines dans les genres Comostola et Albinospila (Lepidoptera Geometridae Geometrinae). Antenor 4: 141-146.
• van Nieukerken EJ, Kaila L, Kitching IJ, Kristensen NP, Lees DC, Minet J, Mitter C, Mutanen M, Regier JC, Simonsen TJ, Wahlberg N, Yen S-H, Zehiri R, Adamski D, Baixeras J, Bartouch D, Bengtsson BÅ, Brown JW, Bucheli SR, Davis DR, De Prins J, De Prins W, Epstein ME, Gentili-Poole P, Gielis C, Hättenschwiler P, Hausmann A,
Supplementary material

Suppl. material 1: List of the Geometrinae species of the world [doi]

Authors: David Plotkin
Data type: Taxonomical checklist
**Brief description:** This table provides a list of all new species descriptions, combinations and other taxonomic changes in the subfamily Geometrinae (Lepidoptera: Geometridae) since 2007 (Sheet 1: "Taxonomic changes since 2007"). This table also provides a list of the 2,643 current valid species names in the subfamily Geometrinae (Lepidoptera: Geometridae), with their authorship and year of description (Sheet 2: "All current Geometrinae species").

Download file (325.00 kb)