

Cimelioidea: A New Superfamily Name for the Gold Moths (Lepidoptera: Glossata)

Shen-Horn Yen^{1,*} and Joël Minet²

¹Department of Biological Sciences, National Sun Yat-Sen University, Kaohsiung 804, Taiwan

²Muséum National d'Histoire Naturelle, Département Systématique & Evolution, USM 602, Case Postale n° 50 (Entomologie), F-75231 Paris Cedex 05, France

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Shen-Horn Yen and Joël Minet (2007) Cimelioidea: a new superfamily name for the gold moths (Lepidoptera: Glossata). *Zoological Studies* 46(3): 262-271. The family name Axiidae has been used both for decapod crustaceans and the Lepidoptera. Having identified the correct authorships and publication dates of the crustacean Axiidae and lepidopteran Axiidae, it has become clear that the latter name should be treated as a junior homonym of the former. The name Anomalidae was occasionally used for this lepidopteran group but is not nomenclaturally available in the Lepidoptera (while Anomalini/-nae is a valid name in the Coleoptera). Cimeliidae Chrétien, 1916 is therefore the only family name that can be considered as valid for the taxa currently included in the lepidopteran Axiidae. A new superfamily name, Cimelioidea, is hereby formally proposed to replace Axioidea. This superfamily is tentatively assigned to "Geometromorpha", but its phylogenetic relationships with the Calliduloidea, "butterflies" (= Hedyloidea + Rhopalocera), Drepanoidea, and Geometroidea (= Uranioidae) cannot be determined without a comprehensive phylogenetic backbone. A synonymic checklist of the Cimeliidae is also provided. <http://zoolstud.sinica.edu.tw/Journals/46.3/262.pdf>

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Since the 1950s, the genera *Axia* Hübner, [1821] and *Epicimelia* Korb, 1900, both endemic to the pan-Mediterranean region, have been placed in the family Axiidae Rebel, 1919 (see Heppner 1998: 21 for use of the vernacular name, gold moths). Previously this group was inconsistently placed either in the Geometroidea (Fletcher 1979) or Drepanoidea (Heppner 1998), and currently most lepidopterists have accepted placing this family in its own superfamily, the "Axioidea" (e.g., Kiriakoff 1952 as Axiadea, Minet 1983 1986 1991 [1998], Scoble 1992, Holloway et al. 2001). However, it has recently been noted that the name Axiidae Rebel, 1919 is a homonym of Axiidae Huxley, [1879], a family name that has been used to represent the "lobster shrimps" (Malacostraca: Decapoda). This homonymy was first identified by Koçak (1989: 148), but it remained unnoticed by

the global entomology community. However, Koçak (1989) misidentified the authorship of the crustacean Axiidae and did not consider that the lepidopteran Cimeliidae (resurrected by Koçak (1983: 138) for the Axiidae auct.) deserves its own superfamily.

The purpose of the present paper was to determine which family group name should be applied to gold moths, and to discuss whether this clade deserves its own superfamily. A checklist of all known species of this circum-Mediterranean family is also provided. We hope that the result of this study will contribute to increasing nomenclatural stability, thus reducing confusion in all of the rapidly developing global species and biodiversity databases (e.g., Species2000, ITIS, GBIF, ZooBank, Zoological Records, and Fauna Europaea).

*To whom correspondence and reprint requests should be addressed. E-mail:shenhornyen@hotmail.com

MATERIAL AND METHODS

Bibliographical investigations

To resolve the relevant historical nomenclatural problems, we investigated all the literature resources including printed literature and archives preserved in the Natural History Museum, London (NHM) and Muséum National d'Histoire Naturelle, Paris (MNHN) (e.g., Góñez Bustillo and Arroyo Varela 1981, Rungs [1982], Freina and Witt 1987, Freina 1994) and digitized taxonomic archives available on various websites, e.g., Google (<http://www.google.com>), the Huxley File (<http://aleph0.clarku.edu/huxley/>), Crustikon (<http://www.tmu.uit.no/crustikon/>), and Koçak's publication list included in CESA (<http://www.members.tripod.com/entcesa/Kocakpubl.pdf>).

Several different approaches were employed to confirm the correct dates of publication of the names involved. For example, according to the *Official List of Names* (Melville and Smith 1987), the valid publication year of Huxley's paper on the classification of crayfishes is indicated as 1879. That paper, which includes a description of the crustacean Axiidae, is sometimes misdated as 1878 (ICZN 1964). For a work including new generic names of moths, the actual date of publication can be inferred from the dates assigned to these names in Nye's (ed.) series *The generic names of moths of the world* (also available at: <http://www.nhm.ac.uk/entomology/butmoth/index.html>). Thus the gelechioid genera *Fugia* and *Parasia* are both attributed to Duponchel, [1846], in volume 6 of *The generic names of moths of the world* (Nye and Fletcher 1991). Accordingly, Duponchel's *Catalogue méthodique des Lépidoptères d'Europe* is dated 1844-[1846] (as in, e.g., Kitching 1984) rather than 1844-[1845] (dates considered by Joannis 1922, p. 280, and Poole 1989). In the same way, the page of that work including the "Anomalides" (p. 188), a new family-group name proposed for "*Timia* Boisduval" (= *Axia*), can be dated [1845] since it is situated between pages 187 and 196, in which the new genera *Metoponia* Duponchel, [1845], and *Orenaia* Duponchel, [1845] were respectively described.

Another approach was used to confirm the actual publication data of Lhomme's (ed.) *Catalogue des Lépidoptères de France et de Belgique* (Vol. 1; 1923-1935), where a section about the Cimeliidae (pp. 365-366) is included.

This section is part of signature 23 (pp. 353-368) and according to Viette (1965: 52), signatures 16 to 26 should have already been published between 1927 and Mar. 1929. Following Viette's method of looking for indications in Lhomme's periodical *L'Amateur de Papillons*, we suspect that 1928 is the possible publishing date of signature 23. Indeed, on pages 358 and 361 of the *Catalogue*, the hawk-moths, *Proserpinus proserpina* (Pallas, 1772) and *Hyles livornica* (Esper, 1780), are not recorded from, respectively, La Tremblade (France, Charente-Maritime) and Sainte-Maxime (France, Var), 2 localities mentioned for these species in the Dec. 1928 issue of *L'Amateur de Papillons* (*Amat. Papillons* 4(10): 158-160). In all probability, then, signature 23 was not published after Dec. 1928. On the other hand, it was not published in 1927 since one can already find on pages 340-341 (as part of signature 22) data on the taxa "*guadarramensis* Boursin, 1928" and "*pyrenaica* Boursin, 1928" (i.e., *Diarsia guadarramensis* and *Rhyacia helvetina pyrenaica* of the Noctuidae). The date of publication of a given work can also be revealed by any handwritten inscription, such as that found on the cover of a copy of Rungs' *Catalogue raisonné des Lépidoptères du Maroc - Tome 2: publié en juin 1982 P.V.* (i.e., published in June 1982 by Pierre Viette). Thanks to this reliable inscription on a copy kept in the library of the Société Entomologique de France, we can confidently date [1982] volume 2 of Rungs' catalogue, despite the annotation "... 30 Juin 1981" printed at the end of the volume.

Material examined

The adult characters of all known species of the Cimeliidae were observed and measured from specimens deposited in the Natural History Museum, London (BMNH), and the Muséum National d'Histoire Naturelle, Paris (MNHN) as well as descriptions extracted from the literature (e.g., Minet [1998]). So far, the early stages of *Axia* have been described for the following 3 species: *Axia margarita* (Hübner, [1813]) (Millière 1864: 37-39, Chrétien 1912, 1916, Marten 1937), *A. napoleona* Schawerda, 1926 (Reisser 1933a-1934a, 1933b-1934b), and *A. vaulogeri* (Staudinger, 1892) (Sourès 1951). We also examined immature specimens of *A. margarita* (cultor [breeder]: Pierre Chrétien) and *A. napoleona* (cult.: Joël Minet) preserved in the MNHN.

RESULTS

The names Anomalidae and Axiidae

Although *Axia margarita* (Hübner, [1813]), the type species of *Axia* Hübner, [1821], was originally described in the genus *Noctua* Linnaeus, 1758 (Noctuidae), the gold moths were inconsistently placed in either the Drepanidae (e.g., Warren 1912, Bang-Haas 1927, Rondou 1933, Seitz 1933) or the Geometridae (e.g., Guenée 1857, Berce 1873, Korb 1900, Berge and Joannis 1901, Staudinger and Rebel 1901, Rebel 1906). *Axia* (as "*Timia* Mihi") was later placed in "Noctuophalaenidi" by Boisduval (1828: 101-103) with many unrelated groups such as *Archiearis* Hübner, [1823] (as *Brephos* Ochsenheimer, 1816 of the Geometridae) and various noctuid family groups (e.g., the Hypeninae, Catocalinae, Acontiinae, Eustrotiinae, Cuculliinae, Stirinae, and Noctuinae). This obviously polyphyletic group was later called "Noctuophalaenides" (Boisduval 1840: 172-176) without significantly changing its composition. However, under article 11.7.1 of the *International code of zoological nomenclature* (the *Code*) (ICZN 1999: 12), the family-group name Noctuophalaenidi cannot be regarded as available since Boisduval used no published generic name as the stem to form this higher taxon.

Subsequently Duponchel (1844-[1846]: 188) proposed Anomalidae (= Anomalides) to accommodate the gold moths. Although the Anomalidae was the 1st family group name proposed for the gold moths, it is still unavailable because it is not based on any lepidopteran genus-group name, but simply derived from the Greek adjective *ανωμαλος* (*anōmalos*), which means irregular or anomalous (Emmet 1991: 219), in allusion to the unusual combination of characters found in the adults of *Axia margarita*. Moreover Duponchel's Anomalidae is a homonym of Anomalini Mulsant, 1842, a tribe of Rutelinae (Coleoptera, Scarabaeidae). The coleopteran Anomalini is not "preoccupied", even if attributed to Blanchard, [1851] (as done e.g., by Ohaus 1918, though with a slightly different dating of "1850"). In fact, Blanchard first proposed a Latinized form for this beetle name, "Anomalitae" ([1851]: 173), but Mulsant's French name "Anomalaire" (1842: 14) can be accepted as nomenclaturally available under article 11.7.2 of the *Code*, in particular since Mulsant's authorship has been recognized by at least some present-day coleopterists (e.g., Jameson et al. 2003: 424). It should also be noted that *Anomala* Samouelle,

1819, the type genus of the tribe Anomalini, can no longer be regarded as a preoccupied name: indeed a senior homonym in the Braconidae (Hymenoptera), *Anomala* von Block, 1799, was suppressed under the plenary powers of the International Commission on Zoological Nomenclature (ICZN 1989: opinion 1546). On the other hand, an ichneumonid subfamily has sometimes been erroneously called "Anomalinae". It has *Anomalon* Panzer, 1804, as the type genus, and its correct name is the Anomaloninae Viereck, 1918 (Yu and Horstmann 1997: 27). Thus, the name of this hymenopteran group cannot be considered homonymous with Anomalini Mulsant, 1842 (= Anomalinae for those authors who raised the Rutelinae to family level).

As mentioned in the introductory section, the gold moths are currently placed in the Axiidae Rebel, 1919, and this family name has indisputably gained general acceptance among entomologists (Zerny and Beier 1936, Marten 1937, Bourgogne 1951, Forster 1954, Dufay 1961, Koçak 1977, Fletcher 1979, Leraut 1980, Gómez Bustillo and Arroyo Varela 1981, Minet 1986, Freina and Witt 1987, Rungs 1988, Scoble 1992, Freina 1994, Vives Moreno 1994, Raineri and Zangheri 1995, Schintlmeister 1996, Pérez De-Gregorio et al. 2001, Minet and Surlykke 2003, etc.). Nevertheless, as stated by Koçak (1989: 148), Axiidae Rebel, 1919, is a junior homonym of a crustacean family name. The latter, which is widely used by carcinologists (e.g., Martin and Davis 2001), was erroneously attributed by Koçak (1989) to "Bates, 1888" (a slip for Bate, 1888). In fact, the crustacean family Axiidae was first precisely described by Bate (1888: 36-37) but its name was originally proposed by Huxley ([1879]: 785), in a table showing a new classification of the "Thoracostraca". Although no characters are specified in this table, Axiidae Huxley, [1879], is an available name since it was published before 1931 and was formed from the stem of an available generic name, namely *Axius* Leach, 1815 (cf. articles 12.1 and 12.2.4 of the *Code*; ICZN 1999: 16). Moreover, only *Axius* was originally included in the Axiidae, and this genus was clearly characterized by Huxley in a dichotomous key (1879: 781). It should also be noted that Axiidae Huxley, [1879], and *Axius*, its type genus, were both placed on the *Official List by the International Commission on Zoological Nomenclature* (ICZN 1964: opinion 712). Unlike the Axiidae Rebel, 1919 which is based on *Axia* Hübner, [1821], crustacean axiids occur nearly worldwide and include many genera

and species (Sakai and Saint Laurent 1989; see illustrations in Ngoc-Ho 2003 and a few color photographs on the above-mentioned Crustikon website). Axiioidea is also used as a superfamily name in the Crustacea (Decapoda: Pleocyemata: Thalassinidea). For all these reasons, it is obvious that the lepidopteran name Axiidae cannot be maintained as such.

Cimeliidae: the only available name for gold moths

If Axiidae Rebel, 1919, was the only available family name for the gold moths, removing the homonymy between this name and Axiidae Huxley, [1879] could have been achieved by asking the ICZN to emend the former by taking its stem to be *Axia*- instead of *Axi*- (cf. recommenda-

Table 1. Synopsis of the Cimeliidae. Infrasubspecific taxa are omitted from the following list. Although Chneour inadvertently used the trinomen "*Axia vaulogeri cannella*" in 2 papers (1955: 292, with spelling mistakes ["*canela*"]; 1963: 110), he did not really intend to propose a new (subspecific) status for the taxon *cannella*, originally described as an aberration (Marten 1937: 548, 577, and 63). Indeed, on page 283 of his 1955 paper, Chnéour refers to the forms "*vaulogeri* Stgr" and "*cannella* Marten" [sic] of *Axia vaulogeri*, obviously regarding these "forms" ("formes", in French) as infra-subspecific entities. In [1982: 280], Rungs proposed the name *asba* for a possible subspecies of *Axia vaulogeri* corresponding to a previously described specimen (Rungs 1975: 70), which is now kept in the MNHN (with a "holotype" label). However, this name cannot be regarded as available since it was proposed conditionally, as shown by a question mark following the abbreviation "n. ssp." (see article 15.1 of the 4th edition of the ICZN)

CIMELIIDAE

EPICIMELIA Korb, 1900

theresia Korb, 1900

tischendorffi Bang-Haas, 1927

tischendorffi Bang-Haas, 1927, an incorrect version of a multiple original spelling

malatyensis (Amsel, 1979)

malatyensis (Amsel, 1979), an incorrect version of a multiple original spelling

schellhornae (Amsel, 1979)

defreina (Witt, 1982)

AXIA Hübner, [1821]

TIMIA Boisduval, [1828], *nec* Wiedemann, 1824

CIMELIA Lederer, 1853

CIMETIMIA Chrétien, 1916, *syn. rev.*

olga (Staudinger, 1900)

margarita (Hübner, [1813])

soledad Schawerda, 1927

andalusica (Marten, 1934)

minuta Marten, 1937

atlasica (Rungs, 1947)

napoleona Schawerda, 1926

vaulogeri (Staudinger, 1892)

ernestina Turati, 1934

thamii (Rungs, 1947)

iblis Rungs, 1950

nesiota Reisser, 1962

tion 29A and article 55.3.1 of the *Code*; ICZN 1999: 34, 58). Nevertheless such an emendation would clearly be unnecessary; indeed, Axiidae Rebel is a junior synonym of Cimeliidae Chrétien, 1916, a name based on a type genus, *Cimelia* Lederer, 1853, which is known to be an objective synonym of *Axia* Hübner, [1821] (Fletcher 1979). Since *Cimelia* has no homonyms, the family name, Cimeliidae, is indisputably available for the lepidopteran genera *Axia* and *Epicimelia* Korb, 1900. It was used by several entomologists during the 1st half of the 20th century: e.g., Oberthür (1922), Joannis (1924), Lhomme et al. ([1928]), Forbes (1936, as a subfamily name in Thyatiridae), and Rungs (1947). Most of these authors were French. After Herbulot's use of "Axiidae" (= "Cimeliidae") in a popular guide to the moths of France (Herbulot 1948: 104), they rapidly abandoned Cimeliidae for the name Axiidae. The latter was thus adopted by Rungs soon after 1948 (1950, 1975, [1982], 1988, etc.). In fact, in the 2nd half of the 20th century, the name Cimeliidae was apparently used by only 2 authors, viz. Koçak (notably 1983: 138) and Seven (1991, 1996). When first proposed by Chrétien (1916: 62), it was associated with Duponchel's name "Anomalidae", as a possible replacement name for the latter. Chrétien wrote "Cimeliidae ou Anomalidae" (i.e., Cimeliidae or Anomalidae) and even on p. 64, "Anomalidae-Cimeliidae": this proposal for "Cimeliidae" may thus be viewed as conditional, but under article 11.5.1 of the *Code* (ICZN 1999: 11), "a name proposed conditionally for a taxon before 1961 is not to be excluded on that account alone". On the other hand, although Chrétien discussed the morphology of "*Cimelia margarita*" (= *Axia margarita*) at length, he did not really describe his family Cimeliidae (first clearly characterized by Joannis 1924). Therefore the family name Cimeliidae Chrétien, 1916, is available under article 12 of the *Code* (ICZN 1999): it definitely meets the requirements of that article, which relates to names published before 1931. In conclusion, we propose to rehabilitate this family name to replace Axiidae in the entomological literature.

The composition of the Cimeliidae

The monophyly of the Cimeliidae is supported by the presence of a paired pocket-like organ on segment A7 of the adult (Minet [1998]; see figs in Forbes 1936, Minet 1983, and Minet and Surlykke

2003), a structure that may function as a phonoreceptor and is unique in the Arthropoda. Currently only 2 genera, *Epicimelia* Korb, 1900, and *Axia* Hübner, [1821], are included in this family. Although some authors consider the former to be a synonym of the latter (e.g., Marten 1937, Amsel 1979, Freina 1981, Witt 1982, Vives Moreno 1994), we maintain the former as a valid genus because the CuA2 vein of *Epicimelia* reaches the termen above the tornus (see Marten 1937: 22, fig. 5), but in all species included in *Axia*, CuA2 runs to the tornus (see Marten 1937: 22, figs. 1-3; note that drawing of fig. 4 is inaccurate with regard to this character). *Epicimelia* is also characterized by a clear-cut autapomorphy: in both sexes, the posterior edges of abdominal terga 2-6 (especially 2 and 3) are distinctly thickened and darkened, i.e., heavily sclerotized (Amsel 1979: fig. 8). On the other hand, the presence of a well-defined areole in *Epicimelia* is as inconsistent as in *Axia* so that the absence of a closed areole (Marten 1937, p. 22, fig. 5) cannot be regarded as an autapomorphy of *Epicimelia*. It is also possible that the monobasic *Epicimelia* represents a derived clade within *Axia*. At present, a comprehensive assessment of character polarity, however, is impossible because the sister group of Cimeliidae is still uncertain (Minet [1998]). Another genus, *Cimetimia*, was tentatively proposed by Chrétien (1916: 64) for *Cimelia vaulogeri* Stgr., i.e., *Axia vaulogeri* (Staudinger, 1892). Although not mentioned by Fletcher (1979), *Cimetimia* is, in our opinion, an available generic name clearly based on *Cimelia vaulogeri* Staudinger, 1892 (type species, by monotypy). Indeed, under articles 11.5, 12.1, and 12.2 of the *Code* (ICZN 1999), *Cimetimia* is not to be rejected, even though it was conditionally proposed and described rather imperfectly (with regard to the arrangement of the branches of Rs in the forewing). It should be noted that this relatively old name was accompanied by a precise "indication", viz. the designation of a species name assignable to it (*vaulogeri*). Subsequently the combination "*Cimetimia vaulogeri*" was used at least once by Joannis (1924) in the legend of a plate showing wing venation drawings (pl. 2, figs. 12, 13). However, as noted by Reisser (1934b: 11), the alleged venational differences between *Axia* and *Cimetimia* are completely unreliable. Since the type species of these genera share a similar course of CuA2 in the forewing, we definitely propose treating *Cimetimia* Chrétien, 1916, as a

subjective synonym of *Axia* Hübner, [1821].

The 6 gold moth species currently recognized (Minet [1998]) were revised by Witt (1982), Freina and Witt (1983 1987), and Freina (1994). Nevertheless *Axia ernestina* Turati, 1934, is only doubtfully regarded as a synonym of *Axia vaulogeri* (following Marten 1937 and Freina and Witt 1987); in fact, with respect to the forewing pattern, this eastern Libyan taxon (Turati 1934: pl. 3, fig. 11) strikingly resembles *Axia nesiota* Reisser, 1962 (Minet [1998]: fig. 15.2B), a Greek taxon recently separated from *Axia vaulogeri* by Freina and Witt (1983). Except for *Axia nesiota*, all these species are represented in figure 1 (= Marten 1937, pl. 3), which gives an outline of the habitus variation in imaginal cimeliids and also shows a larva of *Axia margarita* from southern Spain. For most cimeliid species, subspecies are not yet satisfactorily defined in the recent literature. Accordingly subspecific names are treated as synonyms in the following checklist (as done for, e.g., the Australian Lepidoptera : Nielsen et al. 1996). All of the synonyms are indented and listed in chronological order. *Cimelia mimicaria* Oberthür, 1887, the type species of the genus *Protomeceras* Rebel, 1901, is not listed below because it belongs to the Noctuidae (Nye 1975).

Do we need a new superfamily name to accommodate Cimeliidae?

Seven (1991 1996) places among the Geometroidea the family that she rightly calls the Cimeliidae (following Koçak (1983) for the use of this name). While certain authors still retain a broad concept of the Geometroidea (advocated, in particular, by Brock 1971), most contemporary entomologists split up this assemblage into smaller superfamilies and then place the Cimeliidae (“Axiidae”) either in the Drepanoidea (e.g., Heppner 1998) or, more often, in a monotypic superfamily hitherto called “Axioidea”. As we will see below, the latter course should be adopted, although with a new name: Cimelioidea.

Within the Macrolepidoptera (sensu Minet 1991), the Cimeliidae can be assigned neither to the Noctuoidea (since its members clearly lack thoracic tympanal organs) nor to the Bombycomorpha Fänger, 1999 (= Minet’s clade Mimallonoidea + Lasiocampoidea + Bomby-coidea). In particular, their mesothoracic meron and epimeron touch for only a short distance (Minet 1991: fig. 43; a plesiomorphy), whereas these sclerites share a long junction line in the Bombycomorpha (Minet 1991:

figs. 41, 42, and apomorphy 23). Actually the gold moths belong to a clade proposed by Minet (1991: group “A-G”) and recently termed “Geometromorpha” (Fänger 1999). They indeed share at least 3 synapomorphies with the other lineages of the Geometro-morpha (Calliduloidea, butterflies, Drepanoidea, and Geometroidea), namely (a) a pupa with concealed labial palpi (Minet [1998]: 257), (b) fenestrae laterales that are relatively small (Minet 1991: apomorphy 25), and (c) a metafurca whose proximal edges of the secondary arms are distinctly approximate, especially caudad (Minet [1998]: apomorphy 26) (these secondary arms correspond to the “laminae” of Brock 1971; see Minet’s (2003: 465) definition of the furcopedimeral bands).

Unlike the butterflies, a major branch of the Geometromorpha, members of the Cimeliidae have an egg of the flat type (Chrétien 1916: pl. A, figs. 1-3), a last instar larva with only very few secondary setae, a forewing with a well-developed spinarea (Minet [1998]: fig. 15.1A), an imaginal tergum A2 that is not produced laterad anteriorly (while terga A1 and A2 have a distinctive lateral arm in the butterflies: cf. apomorphy 35 in Minet 1991), etc. On the other hand, they do not share significant synapomorphies with the Calliduloidea (Minet [1998]), a superfamily from which they differ in several respects : a larval proleg with the crochets arranged in a mesoseries (unlike the coronate, i.e., plesiomorphic, arrangement found in the Calliduloidea), the presence of a secondary L seta (cephalad of L3) on A1-A7 in the mature larva (as in Drepanoidea, most Geometroidea, and some butterflies), the absence of chaetosemata in the imago (probably a loss), etc. Finally, the cimeliid pupa does not possess 2 derived traits that may represent synapomorphies of the Drepanoidea and Geometroidea (Minet 1991: apomorphies 40 and 41). Indeed its forelegs project rather feebly cephalad, and its 10th segment is devoid of a dorsal, transverse groove. However, the former character might not be quite decisive owing to a number of reversals found within the Drepanoidea + Geometroidea. By contrast, among the 5 drepanoid autapomorphies recently proposed by Minet (2003: 467-477), at least 2 are clearly absent from the Cimeliidae, namely in the imago, the antero-abdominal tergo-sternal sclerites and a fusion of the neotergite with the marginotergites (in Cimeliidae, sternum A2 only has short anterolateral processes and tergum A1 shows a free, although fairly broad, neotergite). On the other hand, the head without chaetosemata and the

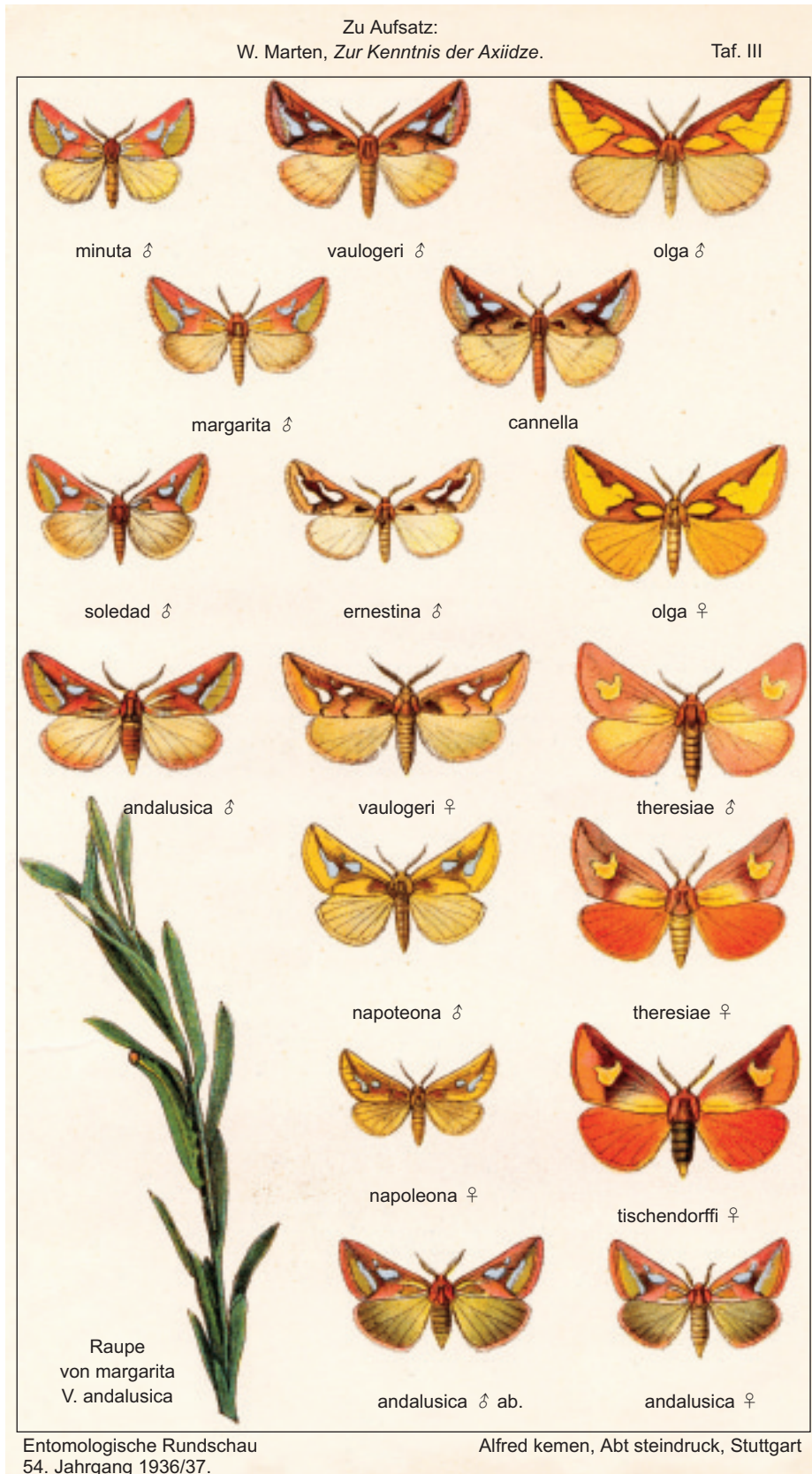


Fig. 1. Adults of all the known species of the Cimeliidae except for *Axia nesiota* (reproduced from Marten, 1937).

thick, blunt apex of the ventral process of the tegula (Minet 1991: fig. 49) are 2 imaginal traits that distinguish the Cimeliidae from the Geometroidea (= Sematuridae + Uraniidae + Geometridae), although a few Geometridae do have, probably secondarily, a tegula ventral process with a rather blunt apex (e.g., members of *Alsophila* Hübner, [1825] of the Alsophilinae). Accordingly, the family Cimeliidae deserves to be placed in a separate superfamily, here formally referred to as the Cimelioidea.

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