

Taxonomic notes on fossil and extant Cantharidae (Coleoptera)

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Abstract. In the present paper the validity of the tribe Cacomorphocerini Fanti & Kupryjanowicz, 2018 bona tribe is explained. It is also highlighted that the genus *Katyacantharis* Kazantsev & Perkovsky, 2019 cannot be included within the tribe Cacomorphocerini, since *Katyacantharis* with the species *K. zherikhini* Kazantsev & Perkovsky, 2019 (type species) is now in familia incertae sedis and not a true Cantharidae. Other taxonomic acts are: *Malthodes aliger* Kazantsev, 2021 subgenus incertae sedis; *Malthodes* (*Malthodes*) Kiesenwetter, 1852 = *Malthodes* (*Maltharcus*) J. Weise, 1892 syn. rest.; *Malthodes* (*Malthodes*) Kiesenwetter, 1852 = *Malthodes* (*Hiranous*) Takahashi, 2021 syn. nov.; *Malthodes* (*Malthodes*) Kiesenwetter, 1852 = *Malthodes* (*Micromalthodes*) Takahashi, 2021 syn. nov.; *Malthodes* (*Malthodes*) Kiesenwetter, 1852 = *Malthodes* (*Sohayakimalthodes*) Takahashi, 2021 syn. nov.; *Podistra* (*Podistra*) Motschulsky, 1839 = *Podistra* (*Pidostria*) Kazantsev, 2023 syn. nov.; *Cantharis* Linnaeus, 1758 = *Thelophorus* Schäffer, 1764 syn. nov. [not synonymized formally previously]; *Thelophorus* Schäffer, 1766 incorrect subsequent spelling; *Telephorus schaefferii* Guérin-Méneville, 1838 incorrect subsequent spelling. Additionally, the descriptor of the following species is Boisduval, 1835 and not Guérin-Méneville, 1838: *Sphaerarthrum praeustum* (Boisduval, 1835), *Sphaerarthrum acutipenne* (Boisduval, 1835), *Sphaerarthrum schaefferi* (Boisduval, 1835). Finally, *Hemipodistra* Ganglbauer, as already amply demonstrated in Fanti (2024b), was described in 1914, and reiterating the date 1922 as recently done by Kazantsev & Savitsky (2025) does not follow the requirements of the Code.

INTRODUCTION

Taxonomy is fundamental to applied biological research, and correct nomenclature is expressly required by the International Code (ICZN 1999). In recent years, the author has personally tried to improve the taxonomy of the family Cantharidae, also called soldier beetles (e.g., Fanti 2019, 2022b, 2022c, 2023, 2025c), but much still needs to be sorted out and refined. Therefore, in this paper, a lot of attention is paid to various genera and subgenera, several species and a tribe of fossil and living Cantharidae, hoping to increase knowledge and help the scientific community about this overly neglected family of insects.

MATERIALS AND METHODS

All relevant literature has been reviewed and studied in detail. The taxonomical acts are based on the rules of the International Code of Zoological Nomenclature, Fourth Edition (ICZN 1999) and its Amendments (ICZN 2012). For the various taxa, in addition to the “classic” author with date, where necessary, also reported are the description page(s) and the type locality. Notes and explanations of the nomenclature acts are also provided.

RESULTS

Cantharis Linnaeus, 1758

= *Thelophorus* Schäffer, 1764: page [5] unnumbered, of the chapter “Specimina. Proben.” [described sine specie, and remained unknown and cited only in Bousquet 2016: 469 and Bouchard et al. 2024: 519] [**syn. nov.**] [formally not synonymized before]

= *Thelophorus* Schäffer, 1766a: TABVLA GENERVM CHARACTERISTICA. CLASSIS I. COLEOPTERO - MACROPTERA. ORDO I. TARSORVM ARTICVLI QVINQVE of the SECTIO III. DE GENERIBVS INSECTORVM [**incorrect subsequent spelling**]

= *Telephorus* [*Telephorvs*] Schäffer, 1766a: TAB.CXXIII., EXPLICATIO TABVLAE CENTESIMAE VICESIMAE TERTIAE, INDEX. Register. [3], Schäffer, 1766b: TABVLA XVI. Sechzehende Tafel. [incorrect subsequent spelling: Bouchard et al. 2024: 519] [generic name currently used: see Bousquet 2016: 468-469 and Bouchard et al. 2024: 519]

For the Telephoridae history see: Watt (1975), Lawrence & Newton (1995), Bouchard et al. (2011, 2024), and Fanti (2014).

Malthodes (*Malthodes*) Kiesenwetter, 1852

= *Malthodes* (*Maltharcus*) J. Weise, 1892 **syn. rest.**

= *Malthodes* (*Hiranous*) Takahashi, 2021 **syn. nov.**

= *Malthodes* (*Micromalthodes*) Takahashi, 2021 **syn. nov.**

= *Malthodes* (*Sohayakimalthodes*) Takahashi, 2021 **syn. nov.**

Malthodes (*Podistrina*) Fairmaire, 1875

Malthodes (†*Libertimalthodes*) Kupryjanowicz & Fanti, 2019

Remarks. Recently, Takahashi (2021) established three new subgenera of *Malthodes* Kiesenwetter, 1852: *Hiranous* Takahashi, 2021, *Micromalthodes* Takahashi, 2021, and *Sohayakimalthodes* Takahashi, 2021, and restored, as a subgenus, *Maltharcus* J. Weise, 1892. Doubts about the validity of these subgenera have already been expressed by Fanti & Pankowski (2024) and subsequently by Kazantsev (2024). The differences between the various subgenera would concern the sclerotization of the last tergites (eighth-tenth) and the shape of the aedeagus (Takahashi 2021). In the authors' opinion, as in the literature of recent decades, these differences should not be considered at a generic or subgeneric level but at most can be recognized as groups of species (e.g., Wittmer 1970, Liberti 2011, 2015, 2016, 2017, 2021, 2023, Kazantsev 2024), whose phylogenetic affinity, however, remains doubtful and probably, in many cases, is not even real. Furthermore, the shape of the last tergites, evolved for reproductive purposes (Magis 1963), is influenced by environmental factors, such as orography (Wittmer 1970, Brancucci 1980, Pankowski 2025) or ecological conditions such as soil humidity and the quality of litter and humus (Liberti 2021). Therefore, these four subgenera are here synonymized with *Malthodes* (*Malthodes*). The subgenus *Podistrina* needs further studies.

Sphaerarthrum praeustum (Boisduval, 1835)

Cantharis praeusta Boisduval, 1835: 132, 689 (reprint of 1835: 132, 678). Loc. typ.: “Nouvelle-Guinée”

Telephorus praeustus Guérin-Méneville, 1838: 75. Loc. typ.: “Nouvelle-Guinée” [redescription].

Sphaerarthrum acutipenne (Boisduval, 1835)

Cantharis acutipennis Boisduval, 1835: 132, 689 (reprint of 1835: 132, 678). Loc. typ.: “à Bourou et à la terre des Papous”

Telephorus acutipennis Guérin-Méneville, 1838: 75. Loc. typ.: “Bourou” [redescription].

Sphaerarthrum schaefferi (Boisduval, 1835)

Cantharis Schaefferi Boisduval, 1835: 133, 689 (reprint of 1835: 133, 678). Loc. typ.: “Port-Praslin , dans la Nouvelle-Irlande”

Telephorus Schaefferii Guérin-Méneville, 1838: 76. Loc. typ.: “port Praslin” [redescription] [**incorrect subsequent spelling**]

Remarks. Boisduval studied the ancient authors and then reported numerous species of Oceania presented by them, providing only extended descriptions of those by the Astrolabe’s voyage (Boisduval 1835: Avertissement). Boisduval knew well Guérin-Méneville’s taxa of the voyage of *La Coquille*, however Guérin’s work was published in 1830-1831 as regards the plates and, due to delays, only in 1838, as regards the text with the most part of the descriptions (e.g., Cowan 1970, Ballantyne & Lambkin 2009, Bousquet 2016). According to the Code, therefore, the species of Boisduval (1835) have precedence over those “homonyms” described by Guérin-Méneville (1838). Wittmer (1969) only with regard to *T. acutipennis* and not the other species listed above, considered Guérin-Méneville in Boisduval, 1835 as the author of this species, however even this ploy cannot be considered correct according to the Code. It is therefore important to make the author’s clarification here, also because *Sphaerarthrum praeustum* is the type species of the genus (Wittmer 1969. Delkeskamp 1977), and because the taxonomic position of various species is not yet completely resolved (Wittmer 1969).

Podistra (*Podistra*) Motschulsky, 1839

= *Podistra* (*Pidostria*) Kazantsev, 2023 **syn. nov.**

Remarks. Kazantsev (2023) says that the new subgenus *Pidostria* Kazantsev, 2023 is very similar to the subgenus *Podistra* Motschulsky, 1839, in the shape of the aedeagus and would differ from the latter in three characters: the elytral vestiture (double elytral pubescence in *Pidostria* instead of a single layer of long pubescence in the other subgenera), the shape of the final palpomeres (labial palpomere as long as wide in *Pidostria* instead of longer than wide in the remaining subgenera) and the dent of the protarsal claw (Kazantsev 2023). However, these characters are well known in the literature to have only a specific value (Fiori 1914a, 1914b). In fact, it is known that some *Cantharis* Linnaeus, 1758, but also species of other genera as Kazantsev (2023) himself knows and cites, have a single type of pubescence while others have two types, such as the related *Cantharis cryptica* Ashe, 1947 and *Cantharis pallida* Goeze, 1777 (Bretzendorfer 2006, Vitali & Fanti 2024). Just as the palpomeres, while remaining securiform, can be of different lengths and shape in the

various species of *Podistra* (Fanti 2021, 2025a). Moreover, the shape of the tarsal tooth, broad and oval in *Pidostria* and narrow in the other subgenera, is a species-level character. For example, we know of a significant difference in tooth shape between the various species of *Cantharis*, and sometimes even between the two sexes (Fiori 1914a, 1914b). A serious subdivision into subgenera should be based on reasonably constant characteristics, presumably of ancient origin, which help us to identify the genetic closeness of forms that, perhaps, are very different from each other. Therefore, without having identified any supraspecific characteristics by the author Kazantsev, the subgenus *Pidostria* Kazantsev, 2023 is considered here a clear and obvious synonym of *Podistra* (*Podistra*).

†**Cacomorphocerini Fanti & Kupryjanowicz, 2018**

Remarks. The tribe Cacomorphocerini Fanti & Kupryjanowicz, 2018 **bona tribe** was synonymized with Cantharini Imhoff, 1856 by Kazantsev et al. (2025), but first Alekseev (2013) and then Kazantsev himself (2013) initially considered, erroneously, the type genus *Cacomorphocerus* Schaufuss, 1891 as a representative of the subfamily Dymorphocerinae Brancucci, 1980. Only recently, Fanti & Kupryjanowicz (2018) and subsequently Kazantsev (2018), definitively inserted these representatives into the subfamily Cantharinae Imhoff, 1856. At least one genus of the tribe Cacomorphocerini appears polyphyletic (Fanti 2024a), therefore *Cacomorphocerus* with 11 antennomeres (*Cacomorphocerus endecacerus* Poinar & Fanti, 2019 and *Cacomorphocerus meridionalis* Kazantsev & Perkovsky, 2020; The latter from the original description has poorly visible antennomeres) do not actually belong to this genus (and probably tribe). Thus, members of the tribe present supernumerary antennae (12-19), this is a peculiarity in the entire panorama of soldier beetles, since it is not present in the fossil and extant representatives of the family Cantharidae. Only a very few species of the living genus *Pseudosilis* Pic, 1911 (Silinae), and two species of the living genus *Heteromastix* Boheman, 1858 (Heteromastiginae) have antennae with 12 antennomeres (Poinar & Fanti 2019, Fanti & Pankowski 2020, Fanti & Menufandu 2022). *Pseudosilis* basically has males' antennomeres VI-VII modified, while, for example in the *Heteromastix*, the 12th antennomere was formed and evolved starting from a fractured, segmentation of the eleventh (Fanti & Menufandu 2022), while the supernumerary antennomeres of the Cacomorphocerini did not evolve through fragmentation of the last antennomere but through fragmentation after the modified central antennomeres, which are often of a particular shape, i.e., saucer-shaped or difform. Finally, it should be noted that Kazantsev et al. (2025) have recently considered a specimen, previously considered a representative of the Malthininae Mimoplatycini: *Mimoplatycs notha* Kazantsev, 2013, as actually being a species of the genus *Sucinatorhagonycha* Kuška, 1996 (Cantharinae Cacomorphocerini), only on the basis of the presence of 12 antennomeres and not 11 as in Malthininae. Leaving aside (Kazantsev et al. 2025) also the number of sternites which are fewer in *Mimoplatycis* than in all other Cantharidae (including *Sucinatorhagonycha*), thus demonstrating the enormous importance of the supernumerarity of antennomeres. Furthermore, in a species of *Cacomorphocerus* in which the last urites are particularly visible, a notable modification of the sternite is

also noted (Fanti 2024a), another character not present in the Cantharini which would lead us to think that we should even attribute to the Cacomorphocerini a taxonomic category superior to the tribe. Taxonomists also tend to consider the differences between two tribes, genera, *etc.* in a clear and dogmatic way, based on the presence or absence of a specific diagnostic character in one or the other taxonomic category examined. This, however, is not what happens in nature, where “at the evolutionary beginning” of a tribe, or a genus, *etc.* we evidently find intermediate forms, and therefore difficult to place in one or the other taxonomic category. The tribe Cacomorphocerini originated, evolved and became extinct in the Eocene from Baltic and Rovno amber (Poinar & Fanti 2019, Fanti & Pankowski 2020, Kazantsev & Perkovsky 2020, Parisi & Fanti 2020, Wentzel et al. 2022), and the particularity of the antennae and sternites demonstrates that it is a particular and peculiar evolutionary line, which for some unknown reason has not survived to the present day, and all this clearly supports the fact of considering it a very different tribe from the Cantharini. The Cacomorphocerini tribe therefore appears to be an excellent candidate for evolutionary studies.

A similar case of intermediate forms is also found in the Malthininae Mimoplatycini Kazantsev, 2013, in fact together with species with six male ventrites we find at least one species with seven male ventrites, therefore also the Mimoplatycini using the reasoning of Kazantsev et al. (2025) should instead be synonymised with the Malthinini (Fanti 2025b).

†*Katyacantharis* Kazantsev & Perkovsky, 2019

Remarks. The genus *Katyacantharis* Kazantsev & Perkovsky, 2019 with the species *K. zherikhini* Kazantsev & Perkovsky, 2019 from the Cretaceous Agdzhakend amber, is not to be related in any way to the tribe Cacomorphocerini Fanti & Kupryjanowicz, 2018 from the Eocene Baltic and Rovno amber, as done by Kazantsev et al. (2025). In fact, in the original description the authors report that “unlike all other existing or extinct cantharine genera, it has alveolar elytra with elongated cells” (Kazantsev & Perkovsky 2019), and combined with the pronotum with the posterior corners produced posteriorly, it is in **familia incertae sedis**. Therefore, it is certainly not a representative of the family Cantharidae where these features are not present and typical (Brancucci 1980), and it is probably *aff.* Lycidae or “primitives” Elateroidea.

†*Malthodes aliger* Kazantsev, 2021

Remarks. Based on the description *Malthodes aliger* Kazantsev, 2021 is peculiar in the panorama of extant and fossil *Malthodes* (Kazantsev 2021). It has a tooth at the base of the hind claws, not previously reported in any *Malthodes* (Kazantsev 2021). It also presents the last tergites unmodified, a very different character from *Malthodes*, with the exception of the fossil subgenus *Libertimalthodes* Kupryjanowicz & Fanti, 2019 (Kupryjanowicz & Fanti 2019). The nominotypical subgenus has in fact, the last urites (both tergites and sternites) more or less modified, hence the attribution to the subgenus *Malthodes* proposed by Kazantsev (2021) is incorrect and therefore, *Malthodes aliger* is a **subgenus incertae sedis**.

Kazantsev (2021) proposed for the species, the similarity with the extant *Malthodes spretus* Kiesenwetter, 1852 but this similarity is not real, in fact as we see in the work illustrating *M. spretus*, the last abdominal segments are strongly modified (Liberti 2015), and very different from *M. aliger*.

†*Mimoplatycis bicolor* Fanti & Vitali, 2017

†*Mimoplatycis marchettii* Parisi & Fanti, 2019

Remarks. *M. bicolor*, based on the description and original photo (Fanti & Vitali 2017) has bi-colored elytra, reddish-brown with a blackish base (Fanti & Vitali 2017), while Kazantsev (2025) says that it may depend on the incidence of light. This is only a hypothesis made without having in hand and having seen the holotype under the stereomicroscope, and therefore incorrect. Furthermore, the specific epithet *bicolor* refers to the entire specimen and not just the elytra.

Even *M. marchettii*, unlike what Kazantsev (2025) says, has a very clear description of the pronotum and is clearly visible in the photo (Parisi & Fanti 2019), and it is so clear that Kazantsev himself managed to make the dichotomous key based on the pronotal characters. Therefore, the authors did not have to make any drawings, since everything was clearly visible and simply because drawings are not required by the Code (ICZN 1999).

Finally, no one ever had any objections when Kazantsev & Perkovsky (2014) did not draw the pronotum of *Mimoplatycis notha* from Rovno amber nor did they draw the last abdominal segments of the fossil *Malthodes* described there (which is much more useful than drawing the pronotum of a *Mimoplatycis*).

Hemipodistra Ganglbauer, [1914]

Remarks. Recently, Fanti (2024b) demonstrated that Ganglbauer (1914) paper, which describes *Hemipodistra*, was validly published under the Code in 1914 (ICZN 1999, 2012).

Kazantsev & Savitsky (2025) argue that the explanation of Fanti (2024b) is unjustified, which is absolutely untrue, given that Fanti provides extensive, detailed reasons for this, including, as stated in his text, the paper's complete satisfaction of Article 8 (ICZN 1999, 2012). Kazantsev & Savitsky (2025), for some strange reason, simply do not accept Fanti's argument, while they themselves fail to justify (rendering them useless) their own objections, citing only the articles of the Code and providing no evidence, let alone any reasons, to support their objections. Here, however, we will see why these complaints addressed by Kazantsev & Savitsky (2025) are completely unfounded.

It should be noted that in the description of the species, as well as for the validity of a publication in the 19th and early 20th centuries, the Code is significantly less restrictive than a contemporary publication (ICZN 1999, 2012). We must also consider that after the publication of the work (Ganglbauer 1914), World War I broke out, resulting in the loss of information about the work, its distribution, the loss of human lives, and obvious and enormous problems in the society of the period.

Kazantsev & Savitsky (2025):

Art. 8.1.1. “it was not done for the purpose of providing a public and permanent scientific record.”

Response: Some people who visited the Museum and had contact with the Münchener Koleopterologische Zeitschrift owned the paper. Even A. Dodero in Italy had it, preserved in the library of the Italian Entomological Society, so the work was undoubtedly public and permanent, also being a classic, printed work. Kazantsev & Savitsky (2025) have not provided any evidence or reasoning to the contrary.

Art. 8.1.2. “it did not make the paper obtainable for the public.”

Response: (See also the answer above.) There is no answer to be given here, since Article 8.1.2. states otherwise: “it must be obtainable, when first issued, free of charge or by purchase”. In any case, whoever received the paper certainly got it for free (very likely) or paid for it.

Art. 8.1.3. “it was not produced in an edition containing simultaneously obtainable copies by a method that assures numerous identical and durable copies.”

Response: So for Kazantsev & Savitsky (2025) the various copies would have been printed differently from each other?. Obviously they were printed simultaneously, they are as durable as any other classic scientific article in the world, and identical (Ganglbauer 1914, 1931 “Heikertinger F.”) to each other.

Recommendations 8A, 8B, 8E, 8F of Article 8. “nor did it provide for wide dissemination, minimum edition of printed works (which is 25), public accessibility of published works, or ensure that works containing new names, nomenclatural acts, or information likely to affect nomenclature contain the date of publication, and information about where they may be obtained.”

Response: As all researchers know, the recommendations are not mandatory, so even if the work of Ganglbauer (1914) did not fully comply with them, it would be valid. Furthermore, the amendment to the Code (ICZN 2012) is retroactive to January 1, 2012 (Cianferoni 2012, ICZN 2012), so it does not apply to the paper of Ganglbauer (1914).

However, can Kazantsev & Savitsky (2025) prove that fewer than 25 copies were printed? No, I believe no one in the world will ever know the real number, while given what was discovered and indicated in Fanti (2024b), we can instead say that most likely 500 copies were not printed, just as, however, very likely a few dozen were printed, thus still complying with the Code’s recommendation (ICZN 2012). We are doing entomology, we are not investigators or detectives, can Kazantsev & Savitsky (2025) for example say how many copies of my recent book on Italian lampyrids (Fanti 2022a) have been printed?, and in 110 years (the time elapsed between Ganglbauer 1914 and Fanti 2024b) will there be anyone who can demonstrate without a shadow of a doubt whether I have printed 20 or 500 copies?.

Therefore, there is no doubt, as already demonstrated in Fanti (2024b), that the date 1914 of *Hemipodistra* Ganglbauer, [1914] is correct, while it is wrong to consider it to be 1922, as in the old literature and especially in Kazantsev & Savitsky (2025).

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