

**HIGHER TAXONOMY  
AND NOMENCLATURE  
OF THE CICADOIDEA OR TRUE  
CICADAS: HISTORY, PROBLEMS  
AND SOLUTIONS**

(Rhynchota Auchenorrhyncha Cicadomorpha)

by

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**Abstract:** The higher classification of the Cicadoidea or true cicadas includes two families: the Cicadidae and the Tettigarctidae. If establishing the latter proved unproblematic, the establishment of the former, by contrast, still vacillates on the foundations of its typification which were called into question at the beginning of the 20th century. To it have been allocated two major groups, seen as either families or sub-families, comprising four determining tribes based on four different Western Palaearctic species, all originally described in the genus *Cicada* L.: *C. orni* L., *C. plebeja* Scop., *C. haematodes* Scop. and *C. montana* Scop. – *plebeja* being initially assigned the role of name-bearing type. Since the recognition of *C. orni* as the Linnaean type genus in 1914, the other three species have not been accorded their undeniable generic status. At the mercy of different authors, the first two Scopolian species, in turn, took the same patronym, *Tibicen*, which was badly defined by its inventor. Consequently, if *plebeja* is classified under *Tibicen*, *haematodes* then defines the taxon *Tibicina*; if *haematodes* is attributed to *Tibicen*, then *plebeja* assumes the binomial *Lyristes plebejus*. Furthermore, *Tibicenidae* and *Tibicinidae*, homonyms of the same root, not only confuse the nomenclature of the family group, but also upset the natural perception of the relative contents of the two taxons.

One species of another group, well represented in Europe and also originally described under the genus *Cicada* – *C. montana* Scop. – finds itself typifying the tribal taxon called either Cicadettini or Melampsaltini, depending on whether the generic name is *Cicadetta* or *Melampsalta*.

Serious confusion and error result from these imbroglios and create incoherence in the nomenclature and composition of the superfamily. The present work reviews the history of the Cicadoidea and provides an objective taxonomic exposition. It finally recommends solutions which promote a decisive clarification of the higher levels of the nomenclature and systematics of the group.

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## Introduction

The higher classification and nomenclature of the Superfamily of the Cicadoidea or true cicadas (*Cicadae verae*, Latreille, 1802: Boulard, 1988) is based primarily on four Palaeartic species of cicada which together establish the vast family of Cicadidae, and on one Tasmanian species, the type species for the small family of the Tettigarctidae. If establishing the latter proved unproblematic (and I have little to add to the matter), the establishment of the former, by contrast, still vacillates most unfortunately on variable bases of typification.

With regard to the first family, the four most common and oldest known species were described at the dawn of entomological taxonomy and placed in the same genus *Cicada* Linn., 1758:

- > The Wild Ash-tree Cicada, *Cicada orni* Linn., 1758,
- > The Big Common Cicada, *Cicada plebeja* Scopoli, 1763,
- > The Fat Red Cicada, *Cicada haematodes* Scopoli, 1763,
- > The Little Mountain Cicada, *Cicada montana* Scopoli, 1772.

In actual fact, some of the basic differences in the males result in these four species representing four genera, genera which are distant enough that each species is either a type or a very common example of a family group taxon. After these genera were named, difficult problems emerged concerning the recognition of the type species, particularly those characterising the higher taxonomic categories – that is, the family group – as determined by the new generic divisions.

For more than a hundred years, the genus *Cicada* had *C. plebeja* Scop. auct. plur. as its type species. Though it was not a legitimate typification, it could have been satisfactory due simply to the principle of long term usage. In 1914, however, some revisionists, noting that this species was not included in the original Linnaean taxon, gave priority to *C. orni* as the type species for *Cicada*. Because of an undeniable fact, the higher classification of the Cicadoidea therefore found itself in havoc, with authors not agreeing on generic statuses prior to assigning the same patronym *Tibicen* to the two large species described by SCOPOLI, *plebeja* and *haematodes*, as well as assigning the same role of type species first to one then the other!

Because of the equal systematic value of the two large Scopolian species, a genus called *Tibicen* (either poorly defined or undefined to begin with) was used alternatively as the type genus for two opposing

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sub-families of the same name, Tibiceninae – the type species being *plebeja* according to some, or *haematodes* according to others! This led, as it still does today, to major errors deleterious to the taxonomic and evolutionary understanding of the Family.

Moreover, when the first case prevailed (Tibiceninae, type species *plebeja*), *C. haematodes* was assigned to the taxon named *Tibicina* while becoming the type species for the sub-family of Tibicininae! Thus a dispute arose in the higher cicadological nomenclature when two key names of family groups differed by just one letter: Tibiceninae and Tibicininae, a disastrous pair and an extra source of much confusion.

Other just as crucial and similarly symmetrical problems can be found elsewhere, notably at the tribal level determined by the little Scopolian species, *C. montana*. Some authors call the tribe Cicadettini while others speak of Melampsaltini...

Hence, it would seem both necessary and urgent to resolve these problems, it being important not only with regard to taxonomy and stable nomenclature, but also because their persisting existence hinders natural classification and the progress of phylogenetic knowledge of this group of Homoptera, whose morphological as well as ethological originality and uniqueness are, moreover, quite remarkable and distinctive.

Having at my disposal quasi-exhaustive historical bibliographic documentation, I again took up my investigations in this tortuous domain of nomenclature. Thus while preparing a basic general work on cicadas, the supplementary exegetic research and highlighting of cryptic elements led me to re-assess the relevant facts concerning this group of problems. Having studied both the original texts and the taxonomic history of cicadas, and taking into account the rules and recommendations of the International Code of Zoological Nomenclature – while always respecting scientific ethics – I propose in the following pages, after a succinct exposé of each crucial case, to provide rigorous solutions which seem appropriate in clarifying the nomenclature and higher systematics of the Cicadoidea or true cicadas. Clearly some of the suggested solutions will upset customary approaches, but one must be aware that, at the family group level, a major or higher classification based on errors will always reveal incoherencies and will never be stable.

- Michel Boulard / Jean Weiner -

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## A.- Critical history of the nomenclature, taxonomy and designation of fundamental types of the family Cicadidae

*The first task that must be done when attempting to clarify the natural history of an animal is to appraise its nomenclature, to accurately sort out the various names given to it in all languages and in different periods.*

BUFFON, The Natural History of Birds

*To clearly make known the genera whose characteristics are hereby given, I have cited under each one a known species... and to it I have added some reliable synonyms; this is sufficient to make myself understood.*

LAMARCK, System of Invertebrate Animals

### I.- THE FIRST PATRONYMS

#### a) *Cicada*, *Tettigonia* and *Tettigia*

The scientific study of cicadas has its true foundation in the fifth volume of the Memoirs of service to the History of Insects that René Antoine Ferchault de RÉAUMUR published in 1740 – more precisely, in the fourth Memoir textually and formally entitled as follows:

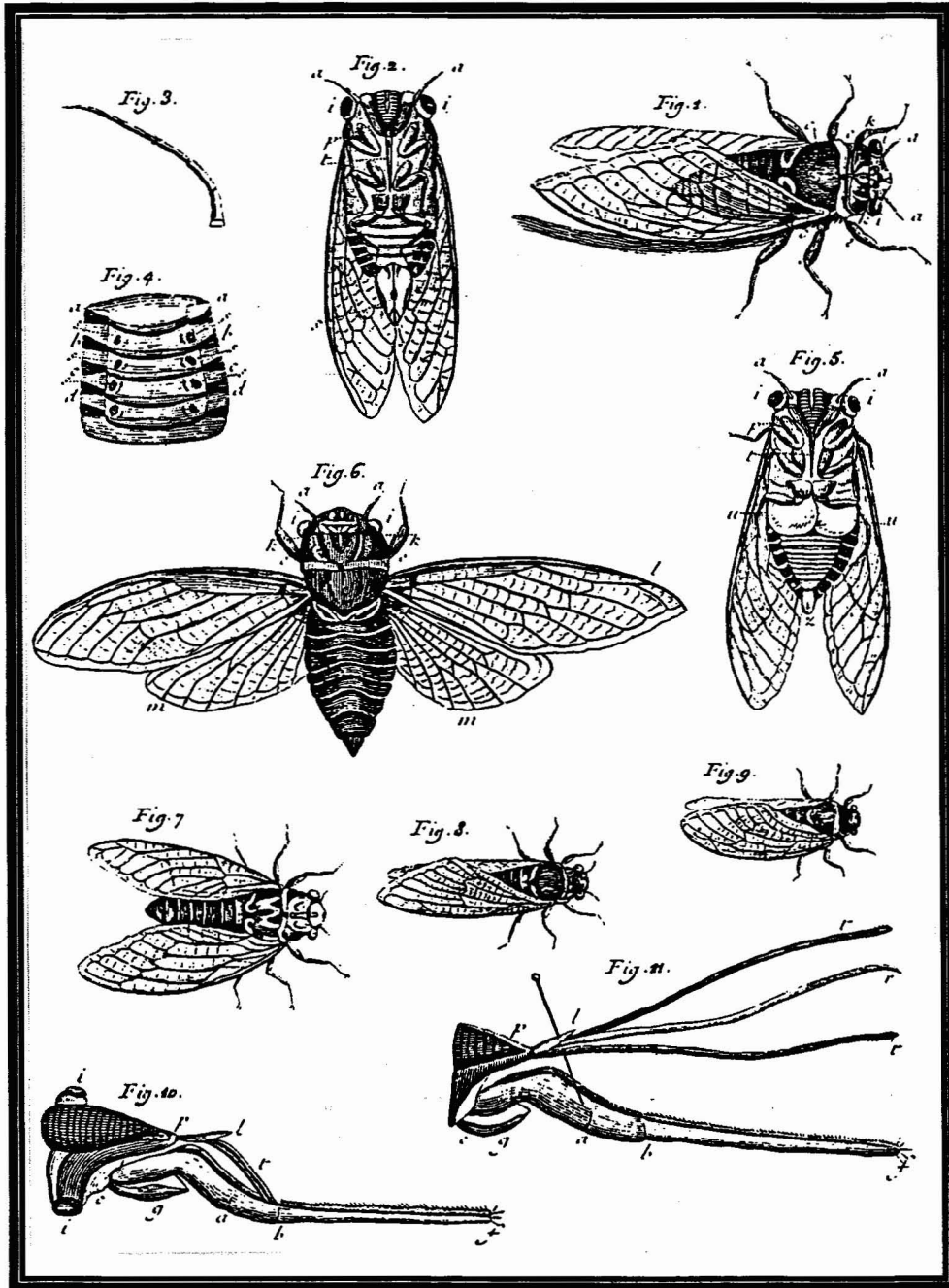
*SUR LES CIGALES;*

*et sur quelques mouches de genres approchants du leur*

Here, in fact, four species of European cicada, distinguished according to their size, are examined, described and drawn: *Figures 1 to 6 show a Cicada of the large species, or certain details of the body: Figure 7 represents a Cicada of medium size, ... Figures 8 and 9 display...two Cicadas of the little species* (op. cit., pp. 195-196) which, we note here, RÉAUMUR had also called Tettigonies (p. 151).

Because of the quality of the engravings – cf. the included reproduction – the scientific patronyms of the cicadas could be given, these being assigned in the Linnaean Latin binomial system only fifteen or so years later. The Cicada of medium size was the first to receive its universal appellation from Carl von LINNÉ [LINNAEUS], who gave it the statutory binomial, *Cicada orni*, in his *Systema Naturae* (tenth edition, 1758, 1, p. 436). The large species, omitted by or unknown to LINNAEUS, was named *Cicada plebeja* by Johan Anton SCOPOLI (1763, *Entomologia carniolica*, p. 117) and it was citizen Guillaume Antoine OLIVIER who named the other two: the Cottony Cicada, *Cicada tomentosa* and the Soot Cicada, *Cicada atra* (1790, *Encycl. méth., Hist. nat. des Insectes*, 5, p.759).

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*RÉAUMUR 1740, Mémoires pour servir à l'Histoire des Insectes, V(4).*  
(Slightly reduced reproduction of Plate 16 of RÉAUMUR's original Memoir)

Cicada was thus the first scientific patronym conferred on cicadas. However, under this name, LINNAEUS included all Latreille's cicadares (= Auchenorhyncha Duméril) at the head of which he placed not the cicadas but the Noctilucae (1758, p.434), that is, the Fulgorids, sensu lato (now the Fulgoromorpha). This may explain why another pioneer of entomological taxonomy, Johann Christian FABRICIUS – himself the author of a *Systema Entomologiae* published in 1775 – having reserved the name Cicada for a section of the Fulgorids, assigned the name Tettigonia to the cicadas, viz., haematodes and orni (op. cit., p. 680), while renaming the Cottony cicada: Tettigonia picta (1794, *Ryngota, Entomologia Systematica Emendata et Aucta*, 4, p. 24), (synonym of Cicada tomentosa Olivier (non Fabr.): Stål, 1869, p. 9; Code, Art. 57h). Tettigonia was thus the patronym chosen by FABRICIUS for the cicadas, in this way distinguishing them from other Ryngota. He most probably did this after comments RÉAUMUR had made concerning his medium-sized species, no doubt referring to the writings of ARISTOTLE (Book V, 30).

## a') Critical Commentary (and appearance of *Tettigia*)

### 1) Non-validity of *Tettigonia*

Be that as it may, the application of Tettigonia to cicadas is invalid, FABRICIUS having not remembered that well before his intervention:  
 -> there already existed a taxon by the name of Tettigonia Linn., 1758, which had been allocated to the green grasshopper (T. viridissima L.) and to related species (Orthoptera);  
 -> the genus Cicada created by LINNAEUS had already been broken up and its contents reduced.

### 2) The forgotten action of Etienne Louis Geoffroy

About twelve years before the publication of Tettigonia Fabr., the very observant Etienne Louis GEOFFROY, following on from RÉAUMUR, had reserved the name Cicada (a Latin word in his text) solely for those large cicadas with *three small smooth eyes* (the ocelli). On the other hand, he allocated the name Tetigonia (spelled with one t) to species with only two ocelli (which later were called Cicadellae).

This was a decisive and fundamental observation. On p.429 of his thick book *Histoire abrégée des Insectes qui se trouvent aux environs de Paris*<sup>(1)</sup>, GEOFFROY clearly distinguishes the natural group of actual cicadas, the



group consisting of – no more and no less – what is currently called the superfamily of Cicadoidea. As examples of the taxon Cicada with its new restrained contents, GEOFFROY even describes *the two species ... which are found in Provence: the yellow-bordered cicada [and] the variegated cicada* (op. cit., loc. cit.), vernacular names for C. plebeja Scop. and C. orni L. respectively. GEOFFROY's nomenclatorial and taxonomic action was confirmed by OLIVIER (1790, op. cit., p.742), then by LATREILLE: implicitly at first in 1802 (*Histoire générale et particulière des Crustacés et des Insectes*, 3, p.257) then very explicitly in 1804 (Ibid., 12, p.302), and not – contra KIRKALDY, 1906, *Entomologist*, 33, p.238 – by O.F. MÜLLER (1764, *Fauna Insectorum Fridrichsdalina*) who on p. 25 still used the term Cicada for all the Cicadares, which DUMÉRIL (1806) later called auchenorhynchal homoptera, a vernacular name which was latinised into "*Auchenorhynchi*" (with a single r\*) in 1843 by, as we recall, AMYOT and AUDINET-SERVILLE.

### 3) The fixing of Cicada for cicadas alone

Using other criteria, RÉAUMUR had recommended the same separation, distinguishing the *Procicadas* or *four-winged flies* which resemble cicadas but *lack the talent of singing* (1740, p.189), whereas more than twenty years later LINNAEUS regrouped the true cicadas in the category of *non-jumping Manniferae* (1767, *Syst. Nat.*, 12th ed., I (2), Hemiptera, p.706), opposing them to the Fulgora and other claimed Cicada<sup>(2)</sup>, all of which jump. This aside, Cicada Lin.Geoff., as OLIVIER wrote it (1790, op. cit., p.742)<sup>(3)</sup>, was the first generic name reserved exclusively for genuine cicadas all displaying the three characteristics which were noted by the forefathers and which have just been emphasised: possession of three ocelli; the capacity to sing (in a manner audible to humans); and the inability to jump. The taxon Cicada was definitively fixed as the type genus for cicadas by HORVATH in 1911 (*Annls. hist. nat. Mus. natn. hung.*, 9, p.30).

In his review, no doubt exhaustive at the time, OLIVIER made mention of three other species of cicada native to Europe: *The Red Cicada*, C. haematodes, unknown to RÉAUMUR, which received its first statutory description from the Austro-Venetian border regions (SCOPOLI, 1763); and two previously unpublished species: *The Silver Cicada*, C. argentata and *The Pygmy Cicada*, C. pygmea (1790, op. cit., pp. 759, 760), both common in the south of France.

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(\*) Auchenorhynchi (with a single r): see Boulard, 1983; Boulard & Mondon, 1995.

#### 4) Lamarck, Latreille and the exemplar-type *C. orni*

None of the pioneering authors had designated any particular species as the name-bearer for the genus *Cicada* L. and hence for all the true cicadas. It is true that at that time the idea of fixing each species by an absolute reference specimen had not yet been considered. It was to be one of the forgotten glories (elsewhere scandalously refuted) of Jean-Baptiste Pierre Antoine de Monet, Chevalier de LAMARCK. In fact it was in the *Système des Animaux sans vertèbres, ou tableau général des Classes, des Ordres et des Genres de ces Animaux* (1801) that the notion of a type species germinated<sup>(4)</sup>. On page "VIII" of his masterly *Avertissement sur l'objet et le plan de cet ouvrage*, LAMARCK announces the principle: *In order to identify with certainty the genera whose characteristics I list here, I have cited for each one a known species, or very rarely several... being enough to demonstrate my concept.* And so, regarding the genus *Cicada*, he inscribed *Cicada orni* L., and it alone, following the diagnosis of the taxon (op. cit., p. 292). At the same time and undoubtedly encouraged by LAMARCK, Pierre André LATREILLE did likewise. In the third volume of his fundamental work in which he regrouped the genera into natural families (Paris, 1802)<sup>(5)</sup>, he firstly deals with the group "Cicadaïres; *Cicadariae*" in which, in an initial division, he distinguishes the "True cicadas; *Cicada verae*" which are brought under the genus *Cicada* as described by GEOFFROY and OLIVIER (though only the latter was cited). He concludes the diagnosis with the following simple and enlightening words: "*Exemplar. Cicada orni* L.", a statement which failed, and still fails, to attract the attention it deserves from later taxonomists.

#### 5) Latreille and the concept of type

However, the concept of an exemplar as the type, and its inherent quality of immutability had not been completely grasped by the "Prince de l'Entomologie". As a result, this led to many tribulations for the systematics of the *Cicada verae*, or Cicadoidea as they are known today. In 1804, while delineating the natural history of cicadas known at that period, LATREILLE listed the names of eight European species, listing first of all, not *C. orni* L., but *C. haematodes* Scop. (p.303). In *Genera Crustaceorum et Insectorum* of 1807, he repeats the offence (Vol. 3, p.154). Three years later, with a stroke of genius, he concludes his work *Considérations générales sur l'ordre naturel des Animaux composant les Classes des Crustacés, des Arachnides et des Insectes* (Paris, 1810) with a *Table of Genera with an Indication of the Species used as the Type* (p. 421). The word

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“type” was actually used, but when it came specifically to the genus Cicada, LATREILLE, still oblivious of his previous designations, typified it by: Tettigonia plebeia Fab. (sic) (op. cit., p.434). It is especially important to transcribe this appellation here in extenso as most authors wrongly interpret this as a synonym of C. plebeja Scop., as we shall later see (§ b'4).

**6) Amyot and Audinet-Serville, 1843**

In their *Histoire naturelle des Insectes Hémiptères* of 1843, Charles Jean-Baptiste AMYOT and Jean Guillaume AUDINET-SERVILLE subdivided the family of Singers or true cicadas into two tribes, one of which – *the Octicelli* – comprised twenty-two original genera with the exception of Cicada Linn. (p. 473). This genus was only one amongst others within a Group 2, called the *Cicadides* (p. 468). Within the taxon Cicada – its contents again considerably reduced with regard to its higher specifics – they put: 1. The Ash Cicada. Cicada fraxini Fabr. (p. 479) [= C. plebeja Scop.]; 2. The Wild Ash Cicada. Cicada orni Linn. (p.481).

**7) Cicada and Tettigia**

AMYOT, 1847a (*Annl. Soc. ent. Fr.*, (2) 5, p.347) later inscribed under the name Cicada only plebeja Scop. (sic), whereas he placed *orni* Linn. – GEOFFROY's variegated cicada – under Tettigia, a new patronym, unfortunately named as it is derived from the Greek Τεττιξ meaning 'grasshopper'.

**8) The taxon Cicada and its meandering allocations**

In brief, the acknowledged historical sequence of the various taxonomic values of the term Cicada can be stated as follows:

- a.-> Cicada Linn., 1758, p. 434 = the group of Cicadares or Aucheno-rhynchal Homoptera.
- b.-> Cicada L.: Geoffroy, 1762, p. 429 = Cicadas *sensu stricto*, with three ocelli, or true cicadas.
- c.-> Cicada L. [Geoffroy] Latreille, 1802, p. 257 = the Cicada verae, with C. orni L. the only species explicitly referenced as the Exemplar in the obviously gestatory sense of a type species according to LAMARCK, 1801.
- d.-> Cicada Latreille, 1804, p.302; 1807, p.154 [non Latr. 1802], first cited species, p. 303: C. haematodes Scopoli.

e.-> Cicada Latr., 1810, p.262 [non Latr., 1802, *nec* Latr., 1804], type species, p. 434: Tettigonia plebeja Fabricius [non Scopoli].

f.-> Cicada Amyot & Audinet-Serville, 1843, p. 473; Amyot, 1847a, p. 347 [non Latr., 1802, *nec* Latr., 1804, *nec* Latr., 1810], *in*: Cicadides, first cited species: Cicada fraxini Fabr. [= C. plebeja Scop.]; whereas:

g.-> C. orni appears in another generic division called Tettigia created specially for it.

### 9) The fixing of C. plebeja Scopoli

From then on, C. plebeja Scopoli continued to be considered by most authors as being the type species of the taxon Cicada, and for a considerable period all classification of cicadas would depend on it as a basis. Notable authors include: Friederisch KOLENATI, 1857 (*Bull. Soc. Nat. Moscow, sect. biol.*, 30, p. 401); Carl STÅL, 1861 (*Annls. Soc. ent. Fr.*, (4) 1, p.614); Franz Xavier FIEBER, 1872 (*Katalog der europäischen Cicadinen*, p.1; 1876, *Cicadines d'Europe*, p. 25); Auguste PUTON (*Catalogue des Hemiptères*, 1875, p. 57; 1886, p. 67; 1889, p. 100); Leopold MELICHAR, 1896 (*Cicadinen von Mittel-Europa*, pp. 4-5). To these authors rallied the great and incomparable cicadologist, William Lucas DISTANT, notably in 1904 (*Ann. Mag. Nat. Hist.*, (7) 14, p.330), and especially in 1906 (*A Synonymic Catalogue of Homoptera*, Pt. 1. Cicadidae, p. 38) and in 1912 (*Genera Insectorum*, p. 30).

### 10) The unknown Linnaean

The erroneous typification of plebeja Scop. for Cicada posed no problem so long as the taxon comprising all the true cicadas was not subdivided – so long as nobody noticed that this species in fact was not included among the cicadas that LINNAEUS had named and described in 1758 when he created Cicada. GEOFFROY, on the other hand, had given the Large Common cicada only a vernacular name. These facts having come to light, it has become clear that the species plebeja Scop. could not be THE type species of the genus Cicada L., nor that of the group Cicada Geoffroy, nor of the *Cicadae verae* Latreille, 1802.

### 11) The Berlin Congress and the action of Van Duzee

It was in 1901, during the Fifth International Congress of Zoology,

held in Berlin, that an absolute ruling – one which became a masterpiece of the Code – was made on this pertinent observation. A classic case was created when applying the ruling to the case of Cicada. It fell on Edward P. Van DUZEE (1914, *Canad. Ent.*, 46, p.384) to restore C. orni L. to its rightful place as type cicada of the Linnaean genus Cicada, despite some agonised wavering (1912, 1914, 1915)<sup>(6)</sup>. Tettigia, on the other hand, became a simple synonym. Because these actions would lead to a number of upheavals in the then existing arrangement for the group of true cicadas, orni L. and plebeja Scop. could not be put together in the same genus. So the Common Cicada – the People’s Cicada – lost its first patronym, given to it at that time by SCOPOLI.

## b) *Tibicen* and *Lyristes*

The reform of the taxon Cicada Linn.: Geoff. had been instigated by LATREILLE. In 1825, he announced a second generic division in a prophetic phrase, one which would plunge the Cicadae verae into a second nomenclatorial and taxonomic slump whose disastrous effects would be felt till the present day!

In a work whose title should be given in full – *Familles naturelles du Règne animal, exposées succinctement et dans un ordre analytique; avec l’indication de leur genre* – where, on p. 426, the group of Cicadaires can be found divided into five tribes, LATREILLE gives a three-line definition for the first tribe, called Singers, which ends abruptly with these words:

*Les genres CIGALE, TIBICEN (C. plebeia).*

In 1827, the work was translated into German by Arnold BERTHOLD. He took the opportunity to latinise the vernacular names of the taxa in the original text, these being later considered invalid. Only the Latin transcriptions of the translator were retained, these in effect providing the sole regulations. However, the conclusion of the paragraph concerning the tribe of Singers – more concise than suggested by the work’s title – concealed a disastrous ambiguity: Did Tibicen include plebeja Scop. or not?... considering that from 1810 onwards this species was quite explicitly the name bearer of the genus *Cigale.Cicada* Latr. (op. cit., p. 262, non Cicada L.: Geoff.) – a disastrous ambiguity that required reflection and clarification, commentary and justification or invalidation, all directed towards the intentions of the authors, ethics and the rules.

## b') Critical and constructive commentary

### 1) Latreille, forgotten first reviser

In 1829, LATREILLE supplied explanatory information for the new, revised and augmented edition of CUVIER's masterly work: *Le Règne animal distribué d'après son organisation*, for which he was requested to deal with the Arthropods. On p. 215 of Volume V, LATREILLE, as his own first reviser, indicates what kinds of cicada comprise his genus Tibicen: *those where, on the underside of the first abdominal segment, there is a notch leaving the tymbals uncovered, ... these include Olivier's C.[icada] haematode[s] and Fab.[ricius]'s T.[ettigonia] picta, hyalina and algira, as well as his T.[ettigonia] orni which in this light could form a separate genus*. Duly noted! And in 1840, in this exact context, RAMBUR placed Cicada baetica, a species with uncovered tymbals, into *Latreille's genus, Tibicen* (sic, p. 199), while in this light C. orni, as we have seen above, formed another genus and became a Tettigia.

Despite the too broad diagnosis, and the variety and disparity of the examples for Tibicen, there is no question of plebeja in LATREILLE for the reason that the tymbals in cicadas called plebeja are entirely covered! Furthermore, as is strikingly shown here, the species cited in 1825 was used only as a general example, chosen to represent the tribe of Singers and placed in parentheses, following basic writing practice. In 1825, Tibicen is nowhere established; it appears only as an appellation of another generic taxon, a simply-mentioned *nomen*, both **vernacular** and *nudum* (see below), whereas in 1829, the imprecision of the translator-reviser turned it into a *nomen incertum*.

### 2) Exegesis of Berthold's translation

Furthermore, BERTHOLD seems not to have been mistaken, carefully writing down the entire name of the cited species, the only alteration to Latreille's prophetic phrase being little noticed but nevertheless very important. His transcription (1827, p. 424) is actually as follows: *Die Geschl. Cicada, Tibicen (Cicada plebeia)* (sic). Thus BERTHOLD clearly noted that at that time plebeja was recognised as belonging to Cicada. Objectively then, Tibicen – even latinised – in 1827 remained a *nomen nudum* and was consequently not established. This is what this examination reveals, but there is more.

### 3) *Tibicen*, *nomen incertum*

In addition to uncovering the above evidence, it is still the case that, for another and just as undeniable a reason, *Tibicen* is a *nomen incertum* – the species cited in brackets by BERTHOLD, likewise by LATREILLE, is not named with the required nomenclatorial precision: the author's name is missing, a neglected fact which is hereby stressed as being of significant importance, as we shall see later.

### 4) *Tibicen plebeja* L. [non Scopoli], new contribution of the exegesis

In the case before us, the mentioning of a species name without its author raises crucial consequences. This is because:

a) The denomination "*C. plebeja*" was applied to two different species of cicada, their originators being respectively: SCOPOLI, 1763, whose definition is given above; and LINNAEUS, 1767, who gave the following diagnosis: *C. Scutelli apice bidentato, elytris anastomosibus quator, lineisque sex ferrugineis* (sic). It is a brief diagnosis, but enough to distinguish the two species. The first *plebeja*, described by SCOPOLI, does not have a bidentate scutellum! However, the rest of the diagnosis from the father of taxonomy contains a mix of information which raises a doubt ("nobody is perfect") – one which can be conclusively seen by examining the type *plebeja* Linn. – as well as another relevant ambiguity, brought to our attention by Zeno Payne METCALF<sup>(7)</sup> at a much later date.

b) The uncertain identification of the European species, as cited by BERTHOLD, places it outside the basic rule relating to the formation of genus types by a reference to the species and its author (KIRKALDY 1900, *Entomologist*, 33, p. 26, the drafter of this rule) and also subjects it to the scrutiny of Articles 67c and 70b of the Code: a type species must always be cited with the name of its author. As a result, it transpires that the two species were not well distinguished and were often confused – in the Natural History cabinets, maybe; in the "literary re-recordings", most definitely! Remember that FABRICIUS (1794, T.[ettigonia] n° 22, pp. 22-23) wrote *Tettigonia plebeja* Linn.. Also, don't forget that appearing in his text of 1810: p.434 as *Tettigonia plebeja* Fab. is what LATREILLE inscribed as typifying *Cicada*. Hence this is not SCOPOLI's nor the author's *plebeja*, but proves to be a pseudotype! Obviously one can see how LATREILLE might have been confused, but both *plebeja* Scop. and *plebeja* Linn.(Fab.) have covered tymbals. This, then, is what a scrupulous examination of the old texts discloses.

### 5) Germar, Burmeister and Westwood

The preceding examination assumes definite importance because successively Ernst F. GERMAR, 1834 (*Revue ent. Silbermann*, 2), Hermann C. BURMEISTER, 1835 (*Handb. Ent.*, 2 (1), Rhyncota), and John O. WESTWOOD, 1840 (*An Introduction to the Modern Classification of Insects*, 2) again discussed the Linnaean species. By the appellation plebeja as inscribed by LATREILLE (1825) and BERTHOLD (1827), but contra LATREILLE (1829) – because, yet again, the neotropical cicada in question also has covered tymbals – they in fact understood plebeja Linn. Fab. Although GERMAR refuted the admission of any cicada genera other than Cicada (op. cit., p. 49), he proposed no less than a special section founded on the Linnaean species. This, he wrote mistakenly (no doubt the first to do so), *encouraged Latreille to form the genus Tibicen* (op. cit., p. 52) which he distinguished in his text thus: *Scutello dilatato, apice profunde emarginato, tarsis biarticulatis*, organising it in the following order: C. mannifera Fabr., C. plebeja Linn. and C. opalina Germ. (sic, op. cit., pp. 56-57). BURMEISTER tacitly changed Germar's unconfirmed taxon into the sub-genus "*Tibicen Latr.*" (op. cit., p.182), enlarging it to contain all species having biarticulate tarsi. WESTWOOD also recommended that *The species with 2-joined tarsi form Latreille's genus Tibicen* (op. cit., p. 422), though according to him it was an entirely separate genus.

The bringing together of all species with biarticulate tarsi – but otherwise unrelated – was, however, not considered and the worth of GERMAR's and WESTWOOD's interpretation, to justify what might have been, was not appreciated. It fell into oblivion. Tibicen Germar, 1834 became a *nomen oblitum* (Art. 23b of Code, 1964 ed.) and, furthermore, once again *incertum* and invalid, since C. plebeja Linn. is both a homonym and the second of the two, and hence does not conform to the rules. On the other hand, GERMAR, as we have seen, proposed another species called "*C. mannifera* Fabr." (sic).

### 6) The two trends

Authors could subsequently be divided into two main trends:

-> That of AMYOT & AUDINET-SERVILLE (1843, op. cit., p. 482), STÅL (1861, *Annl. Soc. ent. Fr.*, (4) 1, p. 617) and DISTANT, 1889 (*A Monograph of Oriental Cicadidae*, pp. 8, 103), who applied Tibicen to haematodes Scop. while recognising the latter as the type species of the genus; or that of Frederick W. GODING & Walter W. FROGGATT (1904, *Proc. Linn. Soc. N.S.W.*, p. 598) who used it in the general sense as recommended in 1829



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but without recognising the type species. This led them to include disparate species within the taxon.

-> That of FIEBER, 1872 (*Katalog der europäischen Cicadinen*, p.1), 1876 (*Cicadines d'Europe*, II. Fam Cicadaea, p.13) and DISTANT, 1905 (*Rhynchotal Notes*, XXX, XXXIII), 1906 (*A Synonymic Catalogue of Homoptera*, Pt 1, Cicadidae), 1912 (*Genera Insectorum*, 142, p. 3) who disregarded the generic name Tibicen and dismissed it without further ado; whereas Vasilii T. OSHANIN, 1912 (*Katalog der paläarktischen Hemipteren*, p. 95) put Tibicen clearly in the category of *nomina nuda*.

### 7) Kirkaldy and Van Duzee

Just after the publication of DISTANT's *Synonymic Catalogue of Cicadidae*, the fruit of peerless taxonomic knowledge, two hemipterists (but not cicadologists) who were devoted but poor exegetes decided to oppose the preceding trends.

The first was George W. KIRKALDY, who took another approach in a commentary (1906, *Entomologist*, 39) concerning the above mentioned Catalogue. In that, DISTANT had confirmed plebeia Scop. as the type species for Cicada and as indicated above, he had – no doubt from experience, but unfortunately without explanation – eliminated Tibicen, something that KIRKALDY refused to accept. The latter (of critical turn of mind and to whom we owe a great deal, but who harboured a deep resentment toward the former) decided to misleadingly reinstate Tibicen, despite the texts ... and his own principles. Thus KIRKALDY claimed that in 1825, *Latreille mentioned it, giving* (sic) '*plebeia*' (Scop.) *as the type* (again sic! op. cit., p. 287). This is a baseless assertion which a simple reading of the original text shows to be specious, pernicious and reprehensible. LATREILLE never intended (cf, § b'1) to designate a plebeian cicada, either Scopolian or Linnaean, as the type species of any genus other than Cicada Latr. (with its covered tymbals).

Elsewhere, in his episodic review of works in which genera have been proposed, or genotypes fixed (1900, *Entomologist*, 33, p. 25), KIRKALDY omitted to take into consideration both:

-> the action taken by the first reviser, LATREILLE, 1829 (KIRKALDY, 1901, *Entomologist*, 34, p. 176: Tibicen omitted);

-> and the subsequent legitimate and completely ethical fixing by AMYOT & AUDINET-SERVILLE in 1843, p. 482, (KIRKALDY, 1903, *Ibid.*, 36, p. 232: Tibicen omitted). This last fixing even agreed with the rules of the period (cf. Art 69a).

Hence KIRKALDY was responsible for an action contrary to a strict principle which he himself had decreed (1900, op. cit., p. 27, "consideration a") and which would be taken up by the Code, namely that to cite the name of a species is insufficient an action to establish a genus, and all the more reason then, as it turns out, that the name must also be underlined whenever the species is mentioned without the author's name!

The second hemipterist in question was Van DUZEE, whose actions did not always achieve the desired success. After having ousted plebeja Scop. from the taxon Cicada (1912, *Buffalo N.Y. Soc. Nat. Sci.*, 10, p.491), Van DUZEE thought it a good idea to put it as the type species for Tibicen, sensu KIRKALDY, re-using his predecessor's specious arguments almost word for word (1914, *Canad. Entomol.*, 46, pp.387-388). Barely a year later, however, in a note which seems to have been overlooked (1915, *Jl. N.Y. Ent. Soc.*, 23, p.23), he again repudiated plebeja Scop. and replaced it with C. plebeja Linn., 1767 [non Scopoli, 1763], a choice which, as we saw above (§ d'4), had been long ago suggested or confirmed by GERMAR, BURMEISTER and WESTWOOD, then rightly abandoned!

#### 8) Van Duzee's unremitting error

Few taxonomists were aware of this latest nomenclatorial action, not even its author! In fact, it seems that Van DUZEE had an unhealthy obsession, not about his 1915 choice, but the preceding one, Tibicen, type species plebeja Scopoli (non Linn.). Each time the occasion presented itself, he renewed this typification (1916, *Ann. Ent. Soc. Am.*, 9, pp. 89-93; 1927, *Pan-Pacif. Ent.*, 4, p. 47), persisting in the error with a narrow-minded stubbornness as rare as it was stupid. This prevented him from:

-> realising that Tibicen Berthold had not been correctly established as demonstrated above:

-> understanding that to make out an author to be saying the opposite of what he is actually advocating is anti-scientific and unethical – specially when it concerns pioneering authors who worked in an era when rules barely existed or had not even taken shape;

-> noticing KIRKALDY's surprising omissions, and hence also reflecting on the troublesome position – no doubt unconsciously tinged with treachery – that the latter had created to support his statements<sup>(8)</sup>.

### 9) The forgotten fixing by Amyot and Audinet-Serville

And yet the choice of the Red Cicada, *C. haematodes* Scop. – one of the most common European species, which LATREILLE had proposed for a clear understanding of his taxon *Tibicen*, once he had properly established it by giving the diagnosis (1829, op. cit., loc. cit.) – permitted not even the least taxonomic prevarication since the cicada in question is completely lacking in cymbacalypts, or tymbal covers. Furthermore this is undeniably the reason why it was fixed as the type species of *Tibicen* LATREILLE 1829 by AMYOT & AUDINET-SERVILLE, **absolutely clearly, within the rules and in the following terms: the genus *Tibicen* Latr. (Règn. anim. 1829. 215) whose type is *Tettigonia sanguinea* Fabr. ... Stoll. pl. II. fig. 11. – [=] *Cicada haematodes* [Scop.] Oliv. ... which has entirely uncovered sound cavities (1843, p. 482).** Thus there was no room for doubt... But alas, on the contrary!

### 10) Consequences

Unfortunately, this fixing, proclaimed in small letters at the end of a paragraph, was curiously also overlooked; it was yet again omitted by KIRKALDY (1903, *Entomologist*, 36), then by Van DUZEE, who both stuck to "*Tibicen* haplotype<sup>(9)</sup> *plebeja* (Scop.)" (sic, 1917, *Catalogue of Hemiptera of America North of Mexico*, p. 488)...

Remaining poorly informed and having total confidence in the writings of the two previous authors, some researchers – namely MYERS and METCALF (along with some modern non-exegetes) – followed in their footsteps while yet another, Franz POCHE, reinforced their erroneous position in 1933<sup>(10)</sup>. They adopted the binomial *Tibicen plebejus* without realising the flagrant antagonism existing between these two terms when associated in this way. *Tibicen* was formed for cicadas with uncovered tymbals, while *plebejus* Scopoli designates a species remarkable for its completely hidden tymbals! This criminal association – contrary to nature, and contrary to the pioneering authors' intentions – was obviously unacceptable for a number of taxonomists (uncertain identification of type species, as applied by article 18 of the Code, relating to improper terms). And these taxonomists, respectful of LATREILLE's cicadological intentions written black on white (as his own first reviser), called the large European Common Cicada *Lyristes plebejus* in agreement with Geza HORVATH who, in a relevant article published in 1926 (*Annl. hist. Nat. Mus. natn. hung.*, 23, p. 96)<sup>(11)</sup>, had given the new name *Lyristes* to the generic taxon which this species determines and belongs to (Art 23 (2)).

### 11) Return to *Cicada plebeja*

There were yet others – mentioned here for the record: William E. CHINA & Ronald G. FENNAH (1945, *Ann. Mag. Nat. Hist.*, (11) 12, p. 711) – who thought it prudent to confirm plebeja (Scop.) as the type-species for Cicada Linn., but it was refuted shortly after by the second author (1947, *Ibid.*, (11) 13, p. 191) thereby sustaining the infernal merry-go-round.

### c) *Tibicen* and *Tibicina*

#### c') Unrecognised validity of the genus *Tibicina*

Meanwhile, regardless of the name chosen for the generic taxon which includes C. plebeja Scop., a second alternative emerged at the same time at the level of the Red Cicada, C. haematodes Scop. The latter, no more so than the big European Common and for reasons of the same order, could not be held in the genus Cicada with the type species orni L.

We have every reason to think that AMYOT in 1847 (*Annls. Soc. ent. Fr.*, (2) 5, p.154) had called the second Scopolian cicada<sup>(12)</sup> Tibicina, a name which is still valid<sup>(13)</sup>. KOLENATI (1857, *Bull. Soc Nat. Moscow, Biol.*, 30, pp.414-415) considered the name as that of a sub-genus, and adding haematodes Scopoli to it, he put the Red Cicada as the first species in the new taxon. In 1872, FIEBER (*Kat. europ. Cicadin.*, p.1) confirmed Tibicina in its nominal role of genus group, while DISTANT, forever repudiating Tibicen (1905, *Ann. Mag. Nat. Hist.*, (7) 15, p.304; *Ibid.*, (7) 16, p. 22), clearly made Tibicina the type taxon for the sub-family with the consequently valid name of Tibicininae<sup>(14)</sup>.

Thus, since 1914 and the legitimate if not tardy fixing of the genus Cicada with C. orni L. as type, authors have not agreed on the generic statuses of the two main Scopolian cicadas ...[nor on their having] the same patronym, Tibicen, given that:

-> either the Red Cicada is Tibicina haematodes (Scopoli, 1763): Amyot & Audinet-Serville, 1843, for those who then call the Common Cicada: Lyristes plebejus (Scop.) Horvath, 1926 – this is the Amyot-Horvath stream;

-> or the Common Cicada is Tibicen plebejus (Scop., 1763): Kirkaldy, 1906, for those others that then call the Red Cicada: Tibicina haema-todes (Scop.) Kolenati, 1857 – this is the Kirkaldy-van Duzee stream.

## c") Critical and constructive commentary

### 1) The dance of errors

As the classification and higher nomenclature of cicadas was founded on these species – being the oldest known as well as sufficiently different to be each placed at the base of individual subfamilies – there have ensued numerous errors and major disorder which have often rendered the composition of the superfamily of Cicadoidea incomprehensible. The list of errors is long. CHINA (1964, *Bull. zool. Nom.*, 21 (2), pp. 154-160), BOULARD (1972, *Entomologiste*, 38 (6), pp. 167-171; 1988, *EPHE, Trvx. Lab. Biol. Evol. Insectes*, 1) have pointed out a number of them. There are others, again in recent literature. I will give here only two rather enlightening examples – one of a general order, the other relating to cicadas of Mediterranean France. Hence, in catalogues and important reference works (METCALF, 1963; SERVADEI, 1967, etc.) one finds:

a) the name Tibiceninae, Distant, 1889, which brings together cicadas with completely uncovered tymbals, being placed synonymously in the list relating to Tibiceninae Van Duzee, 1916, i.e., cicadas with totally covered tymbals! ...

b) remote species, like plebeja Scop. and nigronervosa Fieber, placed in Tibicen, while some very similar forms, such as haematodes Scop. and cisticola Fairmaire (currently faimairei Boulard, 1984), appear in separate families!

### 2) Nomenclatorial ruins

Furthermore, along with other derelict nomenclatures, the second (Kirkaldy-Van Duzee) stream lumps together names having the same radical to nominate taxons of family groups of opposing definition(!). In fact, as applied respectively to the two largest lineages of Cicadoidea, we find on one hand:

-> TibicEnini, TibicEninae (Van Duzee, 1916, *Checklist of Hemip. of America*), TibicEnidae, and on the other:

-> TibicInini, TibicIninae (Distant, 1905, *Ann. Mag. nat. Hist.*, (7) 15), TibicInidae.

The too great a similarity between these terms has led to many errors and confusion, and to often pointless rectifications, all of which have contributed to the Cicadoidea becoming a totally incoherent superfamily. Harmful misunderstandings appeared after DISTANT had reviewed the nomenclature of the higher taxa by establishing the

following equivalence: Tibiceninae... Tibicen Distant, 1889 (*A Monograph of Oriental Cicad.*, pp. 2, 3 & 103) = Tibicininae... Tibicina Distant, 1905 (*Ann. Mag. nat. Hist.*, (7) 15, p. 304; 1905, *Ibid.*, (7) 16, p. 22).

Many of the best, or more recent, authors lost their way: Arnold JACOBI (1907, *Abh. Ber. K. zool. anthrop.-ethn. Mus. Dresden*, 11, p.14, footnote); John G. MYERS (1929, *Insect Singers*, p. 82: Distant's classification... 1889... Tibicininae, sic); Filippo SILVESTRI (1934, *Compendio di Entomologia applicata*, I, p.319: Tibicina plebeja, sic), and again more recently, Tamotsu ISHIHARA (1961, *Ins. Japonica*, I (2) pp. 26, 28) who founds the tribe of Tibicenini as follows: "Tympanic coverings present: T[r]ibicen Latr. 1825, Logotype<sup>(15)</sup> Tibicen haematoides (Scopoli, 1763)" sic!, etc., etc.

### 3) Handlirsch's revision

Various endeavours have been made to remedy this calamitous state of affairs. The most interesting was that by the non-specialist, Anton HANDLIRSCH, who made a great but insufficiently recognised attempt at clarification (cf. ISHIHARA). In 1925, in *Schröder's Handbuch der Entomologie* (III, pp.1115-1117), HANDLIRSCH revised the higher classification of the cicadas, as well as the nomenclature. Of special note are:

a) the appearance of a new subfamily name, Platyleurinae replacing Cicadinae (Distant, 1889, type species plebeja Scop.), thereby raising the tribe name of Platyleurini – created by Edmund SCHMIDT in 1918 (*Stettin. ent. Ztg.*, 79, p.378, Platyleurini, type genus: Platyleura Am. & Serv., type species: C. stridula L.) – to the rank of subfamily;

b) the appearance of a new subgroup (= subtribe) name, Cryptotympanaria to replace Cicadaria Distant, 1904: 329 (type species: plebeja Scop.);

c) the total elimination of the genus name Tibicen.

At the time, HANDLIRSCH was convinced of the necessity of renaming the taxon Cicada...auct. nec L. (mit plebeja Scop.) (op. cit., p.1117). As a result of this, one year later HORVATH would invent Lyristes (op. cit., loc. cit.), a creation which was favourably received, notably by: Victor LALLEMAND (1928, *Mem. e Estud. Univ. Coimbra*, (1), 28, p. 1); Hermann HAUPT (1935, *Homoptera, Die Tierwelt Mittel-europas*, 4 (3), pp. 117, 150); Shonen MATSUMURA (1939, *Ins. Mats.*, 13 (2), pp. 47-49), and many other authors who followed, but amongst whom were not included: Masayo KATO, 1932, 1954, 1956, who only pushed the

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thorny duo back a notch from subfamily to tribe (*The Biology of Cicadas*, p. 65, phylogenical tree, Tibicenini/Tibicinini); John G. MYERS, 1929, who mentioned HORVATH's 1926 article only in the bibliography; nor Zeno Payne METCALF who put too much faith in Van DUZEE, thereby perpetuating the confusion on the matter.

**4) Orian and China**

Since the posthumous publication in 1963 of METCALF's important catalogue of Cicadoidea, Alfred ORIAN (1963, *Ann. Mag. nat. Hist.*, 13 (6), pp. 321-323) quite rightly brought attention to the unfortunate and extremely troubling resemblances which could be encountered at the level of higher nomenclature. The following year, while addressing the International Commission for Zoological Nomenclature, CHINA (1964, *Bull. zool. Nom.*, 21, pp. 154-160) proposed the following:

-> The suppression of the family-group name Tibiceninae as had been suggested by ORIAN (op. cit., p. 323) and its replacement by Platyleurinae Schmidt, as per HANDLIRSCH and firstly MYERS (1928, *Insects of Samoa*, 2 (2) p. 55) type genus Platyleura Am. & Serv., Schmidt, 1918 (op. cit., loc. cit.);

-> The maintaining of Tibicen Latreille in Berthold, 1827 (sic, renewed error) with type species C. plebeja (sic, op. cit., p.159), as admitted by MYERS (op. cit., loc. cit.) but contrary to HANDLIRSCH and to HORVATH in placing Lyristes in disastrous synonymy with Tibicen.

**5) Renewed omissions**

The first section of this double proposition, representing some progress, was accepted by most contemporary authors – the taxon, originally called Platyleurini, and raised to the rank of subfamily, could not because of this action be considered irregular, as may have been thought<sup>(16)</sup> – but the second section was much less accepted due to its having no coordination with the first. By maintaining Tibicen with the pseudotype plebeja Scop., CHINA not only challenged LATREILLE by overlooking and not commenting on the latter's 1829 revision, but also just as blindly took no notice of the legitimate fixing instigated in 1843 by AMYOT and AUDINET-SERVILLE! A great muddle was to continue while genera belonging to different tribes, and species belonging to different genera, still found themselves brought together, as in METCALF's catalogue. Poor us!

## 6) The use of a disastrous name

From all of the above, it appears that the generic use of the term Tibicen – poorly or not defined in the first revisions, with its sub-sequent ambiguous taxonomic fixings giving rise to further divergent interpretations – is the cause of serious nomenclatorial disorder which created distressing instability in the classification of the superfamily of Cicadoidea.

We demonstrated the anti-ethical nature, the non-conformity, and the partial or complete negativity of the partisan actions taken by KIRKALDY, van DUZEE, and by CHINA, while recalling and showing the fixing by AMYOT & AUDINET-SERVILLE (1843, p. 482) who made the Red Cicada (Tettigonia sanguinea Fabr., Stoll = Cicada haematodes Oliv. = C. haematodes Scop.) the type species of the genus consequently attributed to LATREILLE.

To now keep the term Tibicen seriously risks perpetuating the to-ing and fro-ing between the typifications of the major Scopolian species, multiplying the errors and misunderstandings, and blocking scientific progress, hence upsetting – in the full sense of the regulations – both the nomenclatorial stability and systematics of the true cicadas. This is why I am led (BOULARD, M., 1972 and passim) to uphold the idea of the total suppression of the use of the generic name Tibicen, as well as all group names derived from it: TibicEnini, TibicEninae, TibicEnidae.

## 7) Melville and Sims

Elsewhere, our colleagues R.V. MELVILLE and R.W. SIMS (1984, *Bull. zool. Nom.*, 41 (3), p. 164) brought forward a different yet similarly directed and decisive argument, insisting correctly on the fact that since the family-group names TibicIninae and TibicEninae have the same genitive case, tibicinis, it means that they are acceptable homonyms under Article 55 of the Code – the second name, being more recent, must therefore be abandoned (Art. 60).

In the same article (op. cit., pp. 163-184), MELVILLE and SIMS proposed “Alternative A”, p. 180, a multi-level solution to counter “Alternative B” – the status quo, or maintaining the dire state of affairs. “Alternative A” proposed to:

- (1) -> eliminate Tibicen Berthold, 1827;
- (2) -> place the following on the official list of zoological group names:
  - a) *Cicada* Linn., 1758, type species: *Cicada orni* Linn., 1758.



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b) *Tibicina* Amyot, 1847, type species: *Cicada haematodes* Scopoli, 1763.

c) *Lyristes* Horvath, 1926, type species: *Cicada plebeja* Scopoli, 1763;

(3) -> place the following on the official list of zoological family-group names:

a) Cicadidae Berthold, 1827 (as 'Cicadariae'), type genus: *Cicada* Linn.

b) Tibicininae Distant, 1905, type genus: *Tibicina* Amyot, 1847.

c) Lyristinae Gomez-Menor, 1957, type genus: *Lyristes* Horvath, 1926.

### 8) Return to Handlirsch

If I have largely subscribed to the above proposition, I believe, nonetheless, that it is now necessary to amend it as follows:

a) Heeding the Code of nomenclature, the paternity of the family-group Cicadidae must be attributed to LATREILLE 1802, in the form *Cicadae verae* with the name-bearing type being *Cicada orni* L., as noted by him.

b) So as to be both in accordance with the principle of priority as well as the Code (which states (Art. 64) that in choosing the type genus of a family-group taxon, it is not obligatory for the latter to carry the oldest name, but that it must be representative and well known), I have suggested (BOULARD, 1996) replacing the subfamily name Lyristinae Gomez-Menor, 1957: Boulard, 1985, with Platyleurinae Schmidt, 1918: Handlirsch, 1925, type genus *Platyleura* Amyot & Audinet-Serville, 1843: Schmidt, 1918. The choice of Lyristinae could be viewed in the relatively narrow context of the Mediterranean cicadofauna. However, in the incomparably larger context of world cicadofauna, it becomes legitimate to reduce this group to one subtribal rank of the Platyleurini. Likewise, it is useful to return to the Cryptotympanaria as originated by Handlirsch in 1925, but redefined by me in 1979 by raising it to the rank of tribe [Cryptotympanini, Handlirsch: Boulard, 1979, *Revue fr. Ent.*, (N.S.), 1 (2): 58] so as to establish the correspondences desired by the literature: Cryptotympanini [= Tibicenini Van Duzee, Hayashi, 1987 (non Distant) = Lyristarini Gomez-Menor, 1957 = *Lyristini* Boulard, 1988], type species: *Cryptotympana atrata* (Fabricius 1775: 681, as *Tettigonia*: = *T. pustulata* Fab., 1787; 266). The subtribe of Cryptotympanaria is a member of the above re-named tribe of Platyleurini.

## d) Conclusion I

With the total suppression of Tibicen and its objectively justifiable derivatives, the oldest, correctly defined type genera and name-bearers of the major taxa of the *Cicadae verae* or Cicadoidea can be established as follows – taking account of ratifiable equivalences and respecting the higher taxonomic levels as established by METCALF (1963), renewed by BOULARD (1972a/1996<sup>(17)</sup>) and by DUFFELS & van der LAAN (1985), then amended by Masami HAYASHI (1984) and Max MOULDS (1990):

-> *CICADA* Linnaeus, 1758: Geoffroy, 1762: Latreille, 1802...Van Duzee, 1912 [non Latreille, 1810, nec Amyot, 1847, nec... Distant, 1904... 1912], type species: *Cicada orni* Linn., Latreille, 1802: Van Duzee, 1914; type genus of the subtribe CICADARIA, of the tribe CICADINI, of the subfamily CICADINAE [= Gaeaninae, Distant, 1905, 1906], of the family CICADIDAE and the superfamily CICADOIDEA Latreille, 1802.

-> *PLATYPLEURA* Amyot & Audinet-Serville, 1843, type species: *Platypleura stridula* (Linn.), Distant, 1906 [= *C. stridula* Linn., 1758]; type genus of the subtribe PLATYPLEURARIA, of the tribe PLATYPLEURINI Schmidt, 1918: Handlirsch, 1925, [= Cicadinae Distant, 1889... 1912; = Tibicinae (sic) Van Duzee, 1915: = Tibiceninae (sic) Van Duzee, 1916 (non Distant, 1889) Metcalf, 1939, 1955, 1963].

-> *TIBICINA* Amyot, 1847, type species: *Tibicina haematodes* (Scopoli) [= *C. haematodes* Scopoli, 1763, Amyot, 1847, Kolenati, 1857]; type genus of TIBICINARIA, of the tribe TIBICININI and the subfamily TIBICININAE Distant, 1905, 1906 [= Tibiceninae Distant, 1889... Goding & Froggatt, 1904; = Tibiciniinae (sic) Van Duzee, 1915 = Tibicinidae Distant 1905: Metcalf, 1939... Boulard, 1972 and auct.plur.].

-> *CRYPTOTYMPANA* Stål, 1861, type species: *Cryptotympana atrata* (Fabricius, 1775 p.681, as *Tettigonia*) as first good species inscribed by STÅL following his diagnosis, p.613 [Distant, 1904, p.331: "*C. pustulata* Fabr." [1787]; = *Tettigonia atrata* Fabr., 1775 = *Tettigonia pustulata* Fabr., 1787]; type genus of the subtribe CRYPTOTYMPANARIA Handlirsch, 1925 [= Cryptotympanini Boulard, 1979/1996 = Tibicenini Van Duzee, 1915/1916... Metcalf, 1963 and auct. plur., (non Distant, 1889) = Lyristini (Gomez-Menor, 1957: Boulard, 1985/1988].

-> *LYRISTES* Horvath, 1926, type species: *Lyristes plebejus* (Scopoli) [= *C. plebeja* Scopoli, 1763], Horvath, 1926. Genus and species being members of the subtribe Cryptotympanaria Handlirsch, 1925.

## II - CICADETTINI and MELAMPSALTINI

Whatever the statutory denomination of the tribal taxon which goes either by the name "Cicadettini", as announced and defined under the appellation "Cicadinae" by G.B. BUCKTON (1889, *Entomologist*, 22, p. 270), or by the name "Melampsaltini", according to W. L. DISTANT (1905, *Ann. Mag. nat. Hist.*, (7) 16, p. 269 in the form of Melampsaltaria), here – after having revealed the sources of the problem – are new elements which can bring about its solution.

### a) The actions of AMYOT and KOLENATI

The alternative here comes from the positions taken by authors with regard to the article that Charles J.B. AMYOT published in the middle of the 19th century in which these two names have their origin. It has to be remembered here again that we are referring to the work which is part of the taxonomic essay which was published several times between 1845 and 1847 in the *Annales de la Société entomologique de France*, and then in one single volume published by Baillièrè (Paris, 1848, 504 pp., 5 pl. h.t.). In it AMYOT established numerous original taxa including – with regard to the cicadas presently being discussed – those named Melampsalta, Cicadetta and Tettigetia, quoted, what is more, in the same article after the taxon named Tibicina (1847a, *Annls. Soc. ent. Fr.*, (2) 5, pp. 143-238) which was reviewed and recognised as valid, as indicated above.

This historical essay, in which appeared for the first time the great, and still current, taxonomic divisions of the Cicadoidea, was taken into consideration by a number of authorities, including FIEBER, PUTON, STÅL, KARSCH, MELICHAR, DISTANT, etc., for the very interesting new changes of generic value which this paper objectively introduced both in the field of nomenclature and systematics. However, others ignored the paper (mainly HAGEN) or restricted themselves to refuting it (KIRKALDY, HORVATH, METCALF, etc.). These latter took into consideration only KOLENATI's 1857 adaptation of the article (*Bull. Soc. Nat. Moscow, Biol.*, 30, pp. 399-429).

Here is the crux of the present problem, for when KOLENATI referred to the original paper, he did not always interpret it exactly, nor even correctly understand the content of the taxa. And when keeping the denominations proposed by AMYOT, two times out of three, KOLENATI attributed them – as first species (in the sense of type species) – to cicadas different from those designated by his predecessor. In this

way, the second and equally very complex imbroglio affecting the nomenclature and higher taxonomy of the Cicadoidea appeared.

## a') Critical commentary

### 1) Facts of the interpretation

**a) AMYOT's text:** Here is the original order of taxa and first species mentioned, either by description, or by citing a species name known to AMYOT, and for which I have added, where necessary, the most current name, by priority or synonymy:

-> *Melampsalta* Amyot, 1847, p. 155, n° 376; designated species: none specified, but the description given leads directly to *Cicada varipes* Waltl, 1837 (*Isis*, p. 288) [= *Cicada segetum* Rambur 1840, *Faune entomologique* (sic) de l'Andalousie, 5, p. 199].

-> *Cicadetta* Amyot, 1847, p. 156, n° 377; designated species: *haematodes* Fabr. (non Linn., 1767<sup>(14, reminder)</sup>, nec Scopoli, 1763) [= *Tettigonia haematodes* Fabricius, 1775, *Syst. entomologiae*, p. 680 = *Cicada montana* Scop., 1772, *Annl. Historico-naturalis*, 5, p. 109].

-> *Tettigetia* Amyot, 1847, p. 156, n° 378; first species quoted: *pygmaea* Ol. (sic).

**b) KOLENATI's transcription and first species distinguished by him:**

-> *Cicadetta* Kolenati, 1857, p. 417; species cited: *Cicada montana* Scop.

-> *Tettigetia* Kolenati, 1857, p. 422; species cited: *Cicada prasina* Pallas, 1773 (*Reise durch verschiedene Provinzen des Russischen Reichs*, 1, p. 729)

-> *Melampsalta* Kolenati, 1857, p. 425; species cited: *Cicada caspica* (Kolenati, op. cit., p. 425).

One can see that the order of the taxa has been overturned, while two of the three initially chosen (type) species – species from the south-west Palaearctic region – were replaced by species from eastern Europe which were obviously better known to KOLENATI.

### 2) The successors' mistakes

Following on from this, other sources of confusion resulted. The species designated by these two pioneers were most often considered to be congeneric by their successors. These authors, following KOLENATI's arrangement, hastily put them together in a single taxon called: *Cicadetta* Kolenati, the names *Tettigetia* and *Melampsalta* then becoming synonyms (STÅL, 1861, *Annl. Soc. ent. Fr.*, (4) 1, p. 619, et auct. plur.).

As for the authors of the opposing faction, they maintained Melampsalta Amyot at the highest rank. However, not having recognised the species described under that name by the inventor, nor the one which designated Tettigetia, as described by HAGEN (1855, *Stettin Ent. Ztg.*, 16, p. 349), they also united the three taxa into one, placing the names Cicadetta and Tettigetia in synonymy with Melampsalta.

In one case as in the other, **through not being able to recognise the genuineness of the taxons created by AMYOT** – and here I must say that cicadalogical familiarity has shown me that, in his time, AMYOT knew a great deal about cicadas – one finds oneself dealing with a mixed-up, unstable group called either Cicadetta or Melampsalta.

### 3) Reconstructions bound for failure

Attempts at reconstruction or recognition of good species have been tried respectively by: HORVATH (1912, *Annls hist. nat. Mus. natn. hung.*, 10, p.605); SCHUMACHER (1922, *Dt. ent. Z.*, p.208); HAUPT (1935, *Die Tierwelt Mitteleuropas*, 4 (3), p.151); DLABOLA (1963, *Pulçoes cult. Co. Diam. Angola*, 66, pp. 45-53); WEBB (1979, *Annls Soc. ent. Fr.*, (N.S.) 15 (1) p. 230); BOULARD (1980, *Nouv. Revue Ent.*, 10, p. 313) etc. However, drawn into the context of the synonymy discussed above, these attempts were marred by mistakes right from the outset and consequently invalidated.

Yet other authors, namely DISTANT (1906, *Synonymic Catalogue of Cicadidae*, p. 180), OSHANIN (1908, *Ann. Mus. Zool. Acad. Imp. Sci.*, 13, p. 399; 1912, *Kat. Paläarkt. Hem.*, p. 96), and HORVATH (op. cit., loc. cit.), thought it possible to arrange European species in one taxon, Pauropsalta Goding & Froggatt, 1904, with an Australian type species. This was not really hazardous, given the marked similarities between European cicadettan fauna and that of the Antipodes with respect to habitus and genital configuration. However, this was definitively refuted by J.S. DUGDALE (1971, *N.Z. Jl. Sci.*, 14 (4), pp. 856-882).

## b) Constructive commentary

The exposing of three forgotten or long-obscured facts will permit us to clarify the situation and to redefine the status of the tribe:

### 1) Validity of Amyot, 1847a

The taxons created by AMYOT in 1847 have been confirmed, whether fortuitously or not. Regarding this matter, see supplementary note n° 13 concerning the article headed Amyot 1847a, and the unignorable action of the C.I.N.Z. which is definitively attached to it.

## 2) On the type-species of the genus *Melampsalta*

*Melampsalta* and *Cicadetta* are not **originally** synonymic terms, a serious error surprisingly attributed to Carl STÅL 1861 (op. cit.). In fact, they do not designate the same taxon! *Melampsalta* is applied (**re-read** AMYOT, 1847a, p.155) to the Iberian species respectively called *Cicada picta* Germar, 1830 (*Thon, Entomologisches Archiv*, 2 (2), p.6 (42)) [non Fabricius 1794, p.24]; *C. varipes* Waltl, 1837 (*Isis*, p.288); *C. segetum* Rambur, 1840 (*Faun. entom Andalousie*, 5, p.199); *C. decorata* Kirkaldy, 1909 (*Canad. Entomol.*, 41, p.390); and finally *Hilaphura segetum* (Rmbr). This last denomination is worth examining more closely.

In a precise and still current revision (1979, *Annls Soc. ent. Fr.*, (N.S.), 15 (1), pp.227-240), Michael D. WEBB placed this species in the genus *Hilaphura* which he specially created (op. cit., p.231) to separate it from the *Cicadetta*, among which it had long been classified – from PUTON 1875, *Catalogue des Hémiptères d'Europe et du Bassin méditerranéen*, p.58: *Cicadetta picta* (sic)... to Janust NAST 1972, *Palaeartic Auchenorhyncha* (sic), p.154: *Cicadetta segetum* (sic). This revision by WEBB, therefore, spectacularly confirms the relevance of AMYOT's taxonomic creation and the resolution to put *Hilaphura* in synonymy with *Melampsalta* Amyot. At the same time, and in an equally definitive manner, one can assure the exclusion of this species from the taxon *Cicadatra* where some include it – from PUTON 1875, p.58: *Cicadatra segetum* (sic)... to GOMEZ-MENOR ORTEGA, 1957, *Monografia de cicadidos de España*, p.42: Idem.

The taxon *Melampsalta* Amyot, 1847, thus had been properly established, in clear distinction from the one called *Cicadetta* by the same author... need it be emphasised again? The original name is valid and the type species is *Cicada varipes* Waltl, 1837. This recognition eliminates the improper designation *C. caspica* (Kolenati, 1857). Thus the Spanish cicada described by Amyot in 1847 should be called *Melampsalta varipes* (Waltl, 1837). It could therefore quite logically be placed at the head of the tribe, which would then take the name Melampsaltini, but as we shall see, it can be excluded by applying the rule of prior usage.

## 3) On the type genus of the *Cicadetta-Melampsalta* group

Pragmatically, there is no doubt that the first described species of the tribe, and moreover the most widely known one by far, is not *Melampsalta varipes* but actually the small Scopolian cicada *Cicada montana*. This is the one that AMYOT called *Cicadetta* (1847, op. cit.,

p.156) which was then transformed into Cicada (Cicadetta) montana by KOLENATI (1857, op. cit., p. 418) and later into Cicadetta montana by FIEBER (1872, *Katalog. europ. Cicadinen*, p. 2), the species being each time designated as type species of the taxon.

On one hand, in choosing the type genus for a family-group taxon, the Code of Nomenclature stipulates that, while not being obligatory that it bears the name of the oldest genus, it must at least be well known and representative (Art. 64). On the other hand, over the last fifty years or so, increasing agreement – in the sense of Article 40b – has been achieved concerning the tribal name Cicadettini. For these reasons, I proposed (EPHE, *Travx Lab. Biol. Evol. Insectes*, 1, 1988, p. 42) that one should refer to that species which happens to be both the oldest and most generally known one of the group – and one about which the most has been written: C. montana Scopoli, 1772, so as to fix the tribe and hence give it the definitive name of Cicadettini, Buckton, 1889<sup>(18)</sup>.

Furthermore, from a point of view completely unrelated to the rules, it so happens that this latter term is also the most evocative and the most morphologically satisfying with regard to nomenclatorial homogeneity for a tribe which mainly brings together species of small size: Cicadetta meaning 'little cicada'.

### c) Status of the taxon Tettigetia

One of the immediate consequences of the legitimate re-establishment of the taxa Cicadetta and Melampsalta as indicated above was the rehabilitation of the genus Tettigetia. But, unlike the first two, its paternity cannot be ascribed to AMYOT. In fact, his few lines of description apply more to C. argentata Olivier than to C. pygmea Oliv., the first species he mentioned and whose identity he pondered over: pygmaea Ol? he wrote (op. cit., p.156). He further cited a second name, aestuans Fabr. (op. cit., loc. cit.), which corresponds to a third species different to the previous two, this one from North Africa. Should we then consider Tettigetia Amyot, 1847 as a *nomen incertum*?

The still questionable taxon saw its contents unambiguously defined by KOLENATI (op. cit., p.422) who designated C. prasina Pallas, 1776 (op. cit., loc. cit) as the first species of the genus Tettigetia, a species which I confirmed as the type-species in 1980 (*Nouv. Revue Ent.*, 10, p.313) during the rehabilitation of generic taxon.

## d) Conclusion II

To finish this assessment, the three taxa of European Cicadettas find their original denomination in AMYOT's 1847a article, and are established in the following manner:

-> *CICADETTA* Amyot, 1847 (feminine generic name); type species: *Cicada montana* Scopoli, 1772, by original designation [*haematodes* Fabr., as written by AMYOT (op. cit., loc. cit.) is a synonym of *montana* Scop., cf. BOULARD 1981, p.42]. Valid name of type species: *Cicadetta montana* (Scopoli): Fieber, 1872.

-> *MELAMPSALTA* Amyot, 1847 [non Kolenati, 1857, nec Moulds, 1988], [= *Hilaphura* Webb, 1979: Boulard 1988] (feminine generic name); type species: *Cicada varipes* Waltl, 1837, by subsequent designation as recalled and explained above. Valid name of type species: *Melampsalta varipes* (Waltl): Boulard 1988, 1991.

-> *TETTIGETTA* Kolenati, 1857 (feminine generic name): type species: *Cicada prasina* Pallas, 1773, by original designation. Valid name of type species: *Tettigetia prasina* (Pallas): Boulard, 1980.

These three genera are members of the tribe CICADETTINI Buckton, 1889.



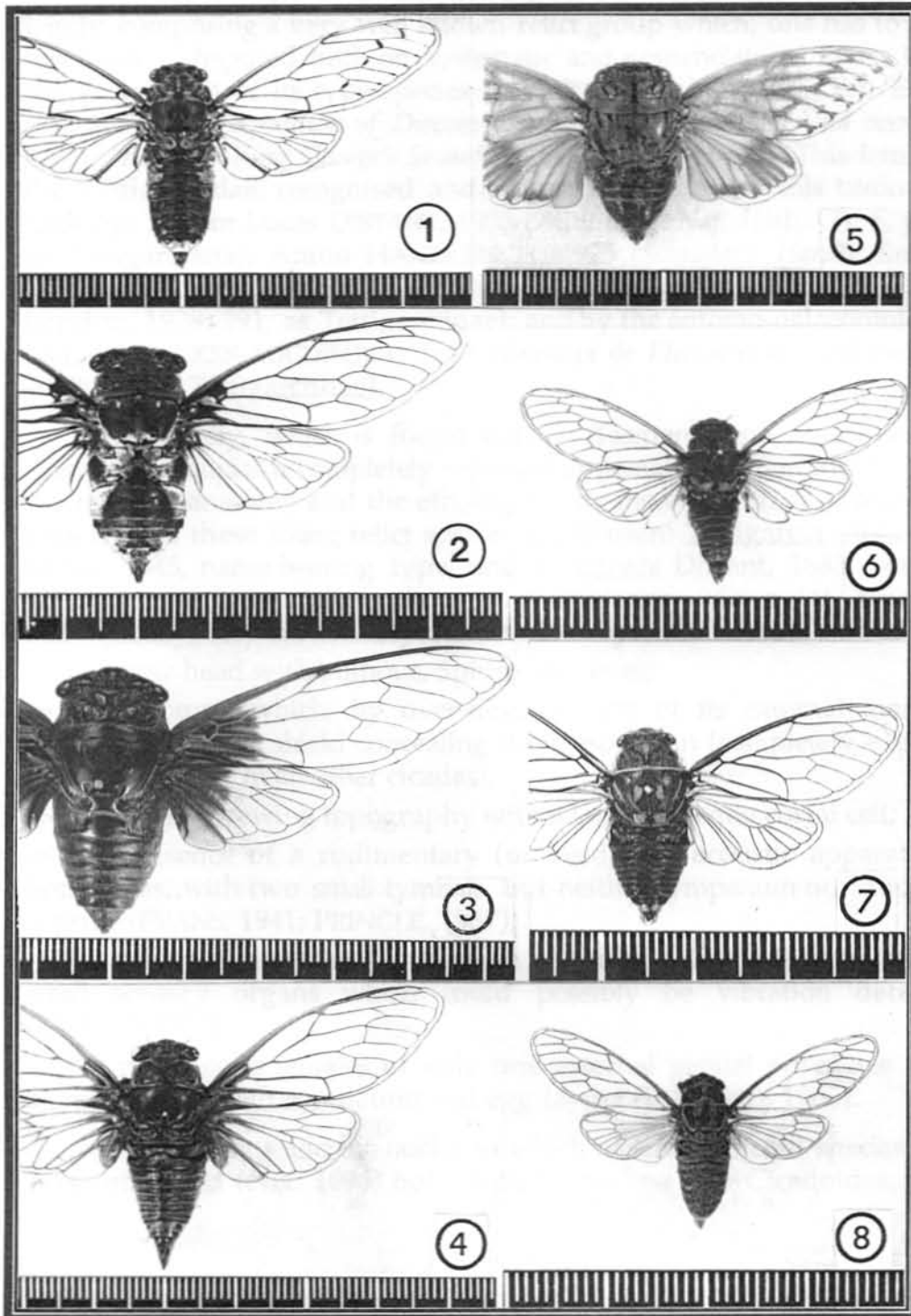
**Plate II (opposite): Photographic images of type species of the main genera providing the basis of, or proposed basis of, the higher classification of the Family of Cicadoidea, as reviewed in these pages:**

- ① *Cicada orni* L., 1758, types species of the genus *Cicada* Linn.: Geoff., of the subtribe *Cicadaria*, of the tribe Cicadini, of the subfamily Cicadinae, of the family Cicadidae, and of the superfamily Cicadoidea Latreille, 1802.
- ② *Lyristes plebejus* (Scopoli, 1763): type species of the genus *Lyristes* Horváth, 1926.
- ③ *Cryptotympana atrata* (Fabricius, 1775), type species of the genus *Cryptotympana* Stål, 1861, of the subtribe Cryptotympanaria, and the tribe Cryptotympanini, Handlirsch, 1925.
- ④ *Tibicina haematodes* (Scopoli, 1763): type species of the genus *Tibicina* Amyot, 1847, of the subtribe Tibicinaria, of the tribe Tibicinini, and the subfamily Tibicininae Distant, 1905.
- ⑤ *Platypleura stridula* (Linn., 1758): type species of the genus *Platypleura* Am. & Aud.-Serville, 1843, of the subtribe Platypleuraria, and the tribe Platypleurini (Schmidt, 1918).
- ⑥ *Cicadetta montana* (Scopoli, 1772): type species of the genus *Cicadetta* Amyot, 1847, and of the subtribe Cicadettaria Buckton, 1889.
- ⑦ *Melampsalta varipes* (Waltl, 1837): type species of the genus *Melampsalta* Amyot, 1847.
- ⑧ *Tettigetia prasina* (Pallas, 1773): type species of the genus *Tettigetia* Kolenati, 1857.



- Higher Taxonomy and Nomenclature of the Cicadoidea -

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## B.- On the family Tettigarctidae

The superfamily of Cicadoidea includes a second and very distinct family, comprising a very well known relict group which, one has to say, has been undisputed both on systematic and nomenclatorial levels since the description of its type species in 1845 (Adam WHITE, in E.J. EYRE, *Journals of the Expedition of Discovery into Central Australia, and overland from Adelaide to King George's Sound. In the years 1840-1: 433*). This family is the **Tettigarctidae**, recognised and successively raised to this taxonomic rank by: William Lucas DISTANT, 1905 (*Ann. Mag. Nat. Hist.*, (7), 6, p.80, as Tettigarctaria); Anton HANDLIRSCH, 1925 (*Schröder's Handb. Ent.*, 3 (17-18): 1161, as Tettigarctini); John G. MYERS, 1928 (*Proc. Zool. Soc.*, London, 1928: 391, as Tettigarctinae); and by the entomo-palaeontologist Elena E. BEKKER-MIGDISOVA, 1949 (*Travaux de l'Institut de Paléozoologie*, 40: 20-21, as Tettigarctidae).

This family, which is found only in Tasmania and south-eastern Australia, occupies a completely separate systematic position due both to the morpho-anatomy and the ethology of its members. In all probability, only two of these living relict species are known: Tettigarcta tomentosa White, 1845, name-bearing type, and T. crinata Distant, 1883, both of which are very interesting from an evolutionary viewpoint. Morpho-anatomically, they are actually characterised by:

- > a narrow head with bulbous, Sphinx-like eyes;
- > a pronotum, which, by over-development of its external margins, forms a protective shield concealing the mesonotum (completely exposed and quite visible in all other cicadas);
- > an ancient forewing topography with a long and wide costal cell;
- > the presence of a rudimentary (or vestigial?) acoustic apparatus in both sexes, with two small tymbals, but neither tympanum nor auditory capsule (EVANS, 1941; PRINGLE, 1957);
- > the presence of a tarsal empodium at the end of the foreleg bearing small sensory organs which could possibly be vibration detectors (MOULDS, 1990);
- > the presence in females of only one external genital pore, one vulva being used for both copulation and egg-laying (BOULARD, 1966).

This is a very ancient family to which at least 15 fossil species have been attributed (NEL, 1996) but which are no less true Cicadoidea; this is

further confirmed by the completely cicadian habitus of the larvae and their hypogean development. According to John W. EVANS (op. cit.) and Max MOULDS (op. cit.), these are fairly gregarious Rhynchota of moderate altitude (200/1800m), with crepuscular, indeed even nocturnal, habits which are always very discreet. This ethology and certain bodily specialisations or functional acquisitions incline one to think that this family possesses species which, in the imaginal as well as the larval stage, have deliberately chosen to live in darkness, losing the use of tymbalisation: aerial sound communication typically used by cicadas for attracting the other sex from a distance. In this hypothesis, the acoustic apparatus of the Tettigarctidae is vestigial rather than rudimentary.

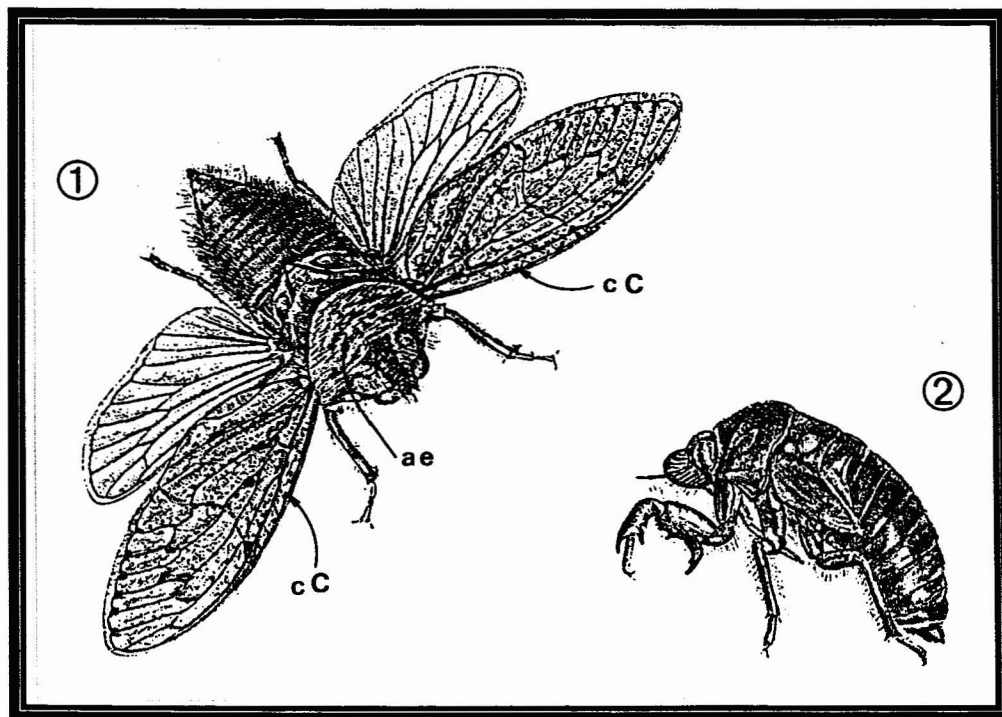


Plate III: *Tettigarcta tomentosa* White, 1845, type species of the genus *Tettigarcta*, White, 1845, of the subtribe Tettigarctaria, of the tribe Tettigarctini, of the subfamily Tettigarctinae and of the family Tettigarctidae Distant, 1905:

① Imago, wings extended: ae = external margin of pronotum forming a post-pronotal shield; cC = costal cell.

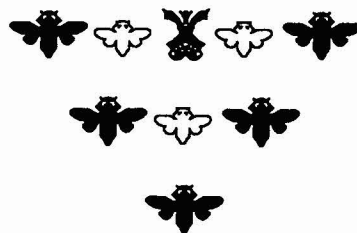
② Profile view of larva.

[Figures taken from the work by Francis Walker, 1850, with additional letters and explications]

### C.- Concluding table

While respecting both ethics and rules, the recommended solutions now permit us, at the end of our examination, to finally exterminate the anarchy reigning over the nomenclature and higher taxonomy of the major representatives of the *Cicadae verae* LATREILLE, the true cicadas or Cicadoidea. These recommendations lead to the main themes of the proposed concluding table of type species, type genera and the higher taxonomy of, firstly, the cicadas comprising the **family of Cicadidae**, which covers the great majority of species evolving both in the holarctic and tropical regions. The table also includes the second **family of Tettigarctidae**, the relict family which is confined to south-eastern Australia and the neighbouring large island of Tasmania.

Genres	espèces-types	Sous-Tribus	Tribus	Sous-Familles	FAMILLES
<i>Cicada</i> L.: Geoffroy,1762	<i>orni</i> Linné,1758	<b>Cicadaria</b> (Latreille,1802)	<b>Cicadini</b> (Latreille,1802): Van Duzee,1916	<b>Cicadinae</b> Ashmead,1888 (Latreille,1802):	<b>CICADIDAE</b> Latreille, 1802 ( <u>Cicadae verae</u> )
<i>Platyleura</i> Amyot & A.-S.,1843	<i>stridula</i> (Linné,1758)	<b>Platyleuraria</b> Schmidt,1918	<b>Platyleurini</b>		
Autres	autres	Autres	Schmidt,1918		
<i>Cryptotympana</i> Stål,1861	<i>atrata</i> (Fabricius,1775)	<b>Cryptotympanaria</b> Handlirsh,1925	Autres		
Autres	autres	Autres	Autres	<b>Tibicininae</b> (Buckton,1889): Distant,1905	
<i>Tibicina</i> Amyot, 1847	<i>haematodes</i> (Scopoli,1763)	<b>Tibicinaria</b> (Buckton,1889):	<b>Tibicinini</b> (Buckton,1889):		
Autres	autres	Distant,1905	Van Duzee,1916		
<i>Cicadetta</i> Amyot,1847	<i>montana</i> (Scopoli,1772)	<b>Cicadettaria</b> Buckton,1889 (Oshanin, 1908)	<b>Cicadettini</b> Buckton,1889 (Metcalf, 1963)		
<i>Melampsalta</i> Amyot,1847	<i>varipes</i> (Waltl,1837)				
<i>Tettigetia</i> Kolenati,1857	<i>prasina</i> (Pallas,1773)				
Autres	autres				
<i>Tettigarcta</i> White,1845	<i>tomentosa</i> White,1845	<b>Tettigactaria</b> Distant,1905	<b>Tettigarctini</b> (Distant,1905): Handlirsch,1925	<b>Tettigarctinae</b> (Distant,1905): Myers,1928	<b>TETTIGARCTIDAE</b> Distant, 1905: (Bekker-Migdisova,1949)





## SUPPLEMENTARY NOTES

(1) A Short History of Insects: The first edition of this work appeared in 1762 – without the author's name! The second edition, reproducing the integral text, this time under the name of Etienne Louis GEOFFROY, dates from 1764. A third, posthumous edition appeared in the press in 1799.

(2) Fulgora and Cicada: in 1767 LINNAEUS very appropriately divided his taxon Cicada, 1758, into two vast groups which are today called Cicadiforms or Cicadomorpha and Fulgoriforms or Fulgoromorpha. LINNAEUS had initiated this separation three years earlier in his study of exotic insects from the *Museum Ludovicae Ulrica Regina*. In this work he had written Laternaria in the place of Fulgora but it was not accompanied by a diagnosis (1764, p.152); (cf. also: KIRKALDY, 1900, *Entomologist*, 33, p.262; FENNAH, R.G. and HEMMING, F., 1954, *Opinions & Declarations rendered by the International Commission of Zoological Nomenclature*, Opin. 322).

(3) Cicada Linn.Geoff.: in 1790, G.A. OLIVIER's discipline and foresight made him follow the recognised name of a natural group (today: a taxon) with the abridged names of the inventor (LINNAEUS) then the reviser (GEOFFROY). Nowadays one does virtually the same. The Code recommends inserting the Latin word *sensu* or else a colon, between the authors' names (abridged or not): Cicada L. sensu Geoff., or Cicada Linn.: Geoffroy.

(4) LAMARCK and the notion of type: The idea which led to fixing a specimen as a definitive reference on which a species name is based had not yet taken shape in LINNAEUS'S time; it would be really forwarded only by LAMARCK in 1801, then confirmed and brought into more widespread use by LATREILLE in 1810. Though essentially contained in LAMARCK's work, where it was clearly expressed despite the words 'type' and 'example' not appearing, the expression of this concept was nonetheless not always taken up nor understood. In 1924, the International Commission of Zoological Nomenclature passed a judgement according to which the "*rigidly construed Lamarck's (1801a) Système des Animaux sans vertèbres is not to be accepted as the designation of type species.*" (sic!, Opinion 79, p. 15). This is an unintelligible decision, historically inaccurate – a most regrettable ostracism – not to be further discussed. (Code, Art 78).

(5) Natural families, LATREILLE. 1802: This work was surprisingly omitted by MYERS in compiling his History of the Classification of Cicadas, in *Insect Singers*, 1929, Chap. VII; (it appears, however, in his bibliography.)

(6) agonised wavering: while apparently taking into account the rule of exclusion stipulated by the Berlin Congress, which concerns species not originally included, GODING and FROGGATT (*Proc. Linn. Soc. N.S.W.*, 3, 1904: 579) inscribed C. ciliaris L. as the type species of the genus "Cicada Linn., 1766" (sic) [non Linn.:Geoff., 1762]. Van DUZEE (*Buffalo N.Y. Bull. Soc. Nat. Sci.*, 10, 1912: 491) firstly designated C. tibicen L., 1758, then (*Can. Ent.*, 46, 1914: 387) C. orni, basing himself on the previous Lamarckian designation of this species of 1801, done quite legitimately and recognised as such (cf. Note 4). C. orni, cited before C. tibicen by Linnaeus, is by far the oldest known and the first historically to have been mentioned as an "exemplar", in the

obviously gestatory sense of a type – LAMARCK, op. cit., p. 292; LATREILLE, 1802, op.cit., p. 257, the latter action ratified by the C.I.N.Z.: Opinions 11, 1914 and 136, 1939. C. orni L. is unquestionably the type species of the genus Cicada Linn.: Geoff. and the fundamental type or name-bearer of the superfamily Cicadoidea.

(7) Cicada plebeja Linn., 1767: applies to a species different from Cicada plebeja Scopoli, 1763, with which, however, it has often been confused in literature. In 1955, METCALF (*Jl. Wash. Acad. Sci.*, 45 (8), p. 267), noting the error, thought it a good idea to rename the Linnaean species with a complete patronym; without a word of explanation that might have enlightened us regarding this action, he named it Fidicina africana (sic). The genus Fidicina does not exist in Africa, while the references appropriate to this cicada, apart from one of the most evocative by WESTWOOD (1840, *Intro. Mod. Class. Ins.*, p. 422), can be found in his [Metcalf's] catalogue (1963, pp. 386-388) mixed up with lots of others relating, for the most part, to the Scopolian species!... The type specimen of C. plebeja Linn. belongs to the collections of the "Linnean Society of London". It is a perfectly preserved female whose label contains only the specific name and an obsolete reference number. No locality is indicated (P. BROOMFIELD, B.M., in *Litt.* 21.1.1985). However, LINNAEUS had mentioned: *Habitat in Italia, Africa* (op. cit., p.707), from where, no doubt, METCALF chose the epithet africana. According to the photographs sent to me by the British Museum and the Linnean Society, C. plebeja Linn. corresponds to Fidicina mannifera (Fabricius, 1803), a very common neotropical species, but completely unknown in both Europe and Africa (cf. BOULARD & MARTINELLI, 1996, p. 23).

(8) To support his statements KIRKALDY did not hesitate in writing (*The Entomologist*, 39, p. 287) that in 1829 "apparently Latreille therein founded [sic] Tibicen with the type plebeja (= haematodes. Scop.) [sic], or perhaps Latreille referred to the species as haematodes" (sic). This is a damning assertion (**re-read** LATREILLE in the text) and an unjustified, absurd and injurious supposition; nowhere in this pioneering author's work is such a confusion discernible.

(9) Haplotype: type designated by simple reference. An often useful designation, but not recognised by the Code.

(10) POCHE (1933, *Konowia*, 12, p.326) tried to support Van DUZEE's postulate, believing he saw an indication of a type species for Tibicen in LATREILLE's 1825 text – yet again a misunderstanding. But this author's argument, based mainly on BERTHOLD's translation, does not withstand critical examination: a) for the same above-mentioned reasons which counter KIRKALDY and Van DUZEE; b) by virtue of the exclusion of vernacular names from texts. Despite his intentions, this led POCHE to provide an extra argument discrediting "Tibicen Latr.". Only the date of 1827 can be retained in the context of zoological nomenclature and Tibicen 1827 cannot be considered as already scientifically introduced: Tibicen Latreille, 1825 being, like the term cigale, a vernacular name! (Code, Art 12c).

(11) Work omitted by MYERS, 1929; op. cit., loc. cit., except in the bibliography.

(12) The second Scopolian cicada: AMYOT's list of synonyms (op. cit., loc. cit.) begins with haematodes Linn. 707. 14, an erroneous designation repeated in C. STOLL (1788, *Cicadas*, pl. II, fig.11), who incorrectly designates it as the second Scopolian species. STOLL's drawings, the other references, and the description provided by AMYOT correspond well with C. haematodes Scopoli.



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**Reminder:** *C. haematodes* Linn., 1767, p.707 [non Scopoli, 1763] = *Tettigonia cantans* Fabricius, 1764, p.20... = *Euryphara cantans* (Fabr.): Gomez-Menor Ortega, 1957, p.75 (cf. BOULARD, 1981, *Bull. Soc. ent. France*, 86, p.42).

(13) **Validity:** In 1963, the International Commission of Zoological Nomenclature (*Bull. Zool. Nom.*, 20, p.423) rejected most of the designations proposed by AMYOT between 1845 and 1847 (*Anns. Soc. ent. Fr.*, (2), vols. 3-5) **but NOT those contained in the article (op. cit, vol 5, pp. 143-238) where the cicadas are dealt with!** The invalidating text **does not mention** this article. Also, in accordance with the regulations (Art. 78,b,e), the taxons of actual generic value which are in fact established in this article (namely those by the name of *Tibicina*, *Melampsalta*, and *Cicadetta*) not only still stand but are thereby confirmed as valid. May my colleagues R.V. MELVILLE and R.W. SIMS, secretaries of the C.I.N.Z., please find expressed here again all my thanks for having brought this important fact to my attention. This obliges us to definitively recognise all the value of the nomenclatorial and taxonomic research of AMYOT 1847a with regard to cicadas as well as neighbouring groups dealt with in the same article.

(14) *Tibicininae* Distant 1905, p. 304: the only valid name. The often forwarded expression 'Tibicininae Buckton, 1889' can be found in Buckton's original publication (1889, *Entomol.*, 22, p.270) with neither diagnosis nor accompanying type genus; consequently, the term has no taxonomic value. This fact here takes on special importance.

(15) **Logotype:** type by subsequent designation. Uncodified term.

(16) **Irregular:** *C. plebeja* can be included in the tribe of Platyleurini. It is found in a tribe which has been called successively: Cicadini Distant, 1904 (*Ann. Mag. Nat. Hist.*, (7) 14, p.329); Tibicenini Van Duzee, 1916 (*Checklist of Hemiptera*, p.55) and *auct. plur.*; Lyristarini Gomez-Menor, 1957 (*Monografia de cicadidos (Homoptera) de España* p.28), amended to Lyristini (Blrd, 1972, *Entomologiste*, 38, p.169). The large common European in fact belongs to the subtribe of Cryptotympanaria (HANDLIRSCH, 1925).

(17) 1996: "Les Cigales de la France méditerranéenne" in: BOULARD & MONDON, 1996, *Vies et Mémoires de Cigales. Provence, Languedoc, Méditerranée*, 2nd reviewed and augmented edition. Barbentane, Editions de l'Equinoxe, 160pp., 336 fig., and a CD (compact disc).

(18) *Cicadettini* (Buckton, 1889): various catalogues give the date of creation of the tribe Cicadettini as 1890 (BUCKTON, *Monograph of the British Cicadae or Tettigiidae*, I, p.XXXIV) – but this is another mistake. From 1889 (*The Entomologist*, 22, p. 270), BUCKTON mentions only the genus *Cicadetta* for defining and conveying the contents of the tribe which at the time he called Cicadinae. In this regard, his description is clear and conforms to the rules (Art. 11); he published it again in 1890.



## Authors cited and main references

- AGASSIZ, J. L. R., Erichson, G. F. & Germar, E. F., 1842.- Nomina systematica Generum hemipterorum, tam viventium quam fossilum... *Nomenclator zoologicus*, 1842: 1-20.  
 —, 1845(6).- Hemiptera. (Addenda et Corrigenda).- *Nomenclator Zoologicus*, 1846: 1-16.
- AMYOT, C. J.-B., 1847.- Rhynchotes. Ordre deuxième. Homoptères. Homoptera Latr.- *Annls Soc. ent. Fr.*, (2) 5: 143-238.  
 —, 1848.- *Rhynchotes. Méthode mononymique*.- Baillière éd., Paris, 1848: 1-504.
- AMYOT, C. J.-B. & Audinet-Serville, J. G., 1843.- Homoptères. Homoptera Latr., in: *Histoire naturelle des Insectes. Hémiptères*. De Roret éd., Paris, 1843 : 455-588.
- ASHMEAD, W. H., A proposed classification of the Hemiptera.- *Ent. Am.*, 4: 65-69.
- AYMONIN, G., 1964.- L'emploi des termes taxonomie et taxinomie.- *Bull. Soc. bot. Fr.*, 111 (3-4): 139-140.
- BEIER, M., 1938.- Homoptera, Pflanzensauger (Zikaden und Pflanzenläuse).- in: Kükenthal, *Handbuch der Zoologie*, Berlin, 4: 2205-2456.
- BEKKER-MIGDISOVA, E. E., 1949.- Mesozoic homoptera from Central Asia.- *Travaux de l'Institut de Paléozoologie de l'Académie des Sciences de l'URSS*, 40: 1-68.
- BERNARDI, G., 1957.- Contribution à l'étude des catégories taxonomiques: I. Avant-propos, Nomenclature et définitions.- *Bull. Soc. ent. Fr.*, 61, 1956 (1957): 194-200.  
 —, 1958.- Id., II. Les règles internationales de la Nomenclature zoologique et la notion des catégories taxonomiques.- *Ibid.*, 62, 1957 (1958) : 224-250.
- BERTHOLD, A., 1827.- *Latreille's Natürliche Familien des Thierreiches. Aus dem Französischen. Mit Anmerkungen und ausätzen*.- Weimar, 1827: 1-604.
- BLANCHARD, E., 1849.- Cigale, in: D'Orbigny, Ch., *Dictionnaire universel d'Histoire naturelle*, III, Paris, 1849: 671-676.
- BOULARD, M., 1972.- Les positions génériques réelles des Cigales françaises et leur classification.- *L'Entomologiste*, 38 (6) : 167-171.  
 —, 1973.- Les Ydiellinae, sous-famille nouvelle de Cigales Platypediidae (Hom.). Clé des familles et sous-familles des Homoptères Cicadoidea.- *Annls Soc. ent.*, N.S., 9 (4): 841-852.  
 —, 1975.- Une nouvelle Tribu de Cigales Platypediidae (Hom.).- *Doriana*, 5 (219): 1-3.  
 —, 1976.- Sur une deuxième Cigale africaine dépourvue d'appareil sonore (Homoptera).- *Bull. Inst. fond. Afr. noire*, A, 37 (3): 629-636.  
 —, 1979.- Cigales nouvelles des Iles Salomon et des Iles Sous-le-Vent. Notes biogéographiques.- *Revue fr. Ent.*, n.s., 1 (2): 49-60.  
 —, 1980.- Cigales nouvelles ou mal connues d'Afrique du Nord.- *Nouv. Revue Ent.*, 10: 313-324.  
 —, 1981.- Matériaux pour une révision de la faune cicadéenne de l'Ouest paléarctique (Hom.).- *Bull. Soc. ent. Fr.*, 86: 41-53.  
 —, 1984.- La Cigale des cistes de Fairmaire, son identité scientifique et sa localisation géographique in *Gallia primordia Patria*.- *Entomologia gallica*, 1 (2): 45-48.  
 —, 1984.- Arguments pour la suppression du nom de genre *Tibicen* et de ses dérivés dans la nomenclature de la Superfamille des Cicadoidea.- *Bull. zool. Nom.*, 41 (3): 166-179, 181-184.  
 —, 1985.- Comment on the proposed conservation of *Tibicina* Amyot, 1847 and *Lyristes* Horváth, 1926. (2).- *Ibid.*, 42 (3): 212-214.  
 —, 1988.- Taxonomie et Nomenclature supérieures des Cicadoidea. Histoire, problèmes et solutions.- *E.P.H.E., travaux du Laboratoire Biologie et Évolution des Insectes*, 1: 69 pp.  
 —, 1991.- Taxi, Taxo, entomique et phéromone.- *L'Entomologiste*, 47 (1): 53-56.  
 —, 1991.- Quelle espèce-type pour le genre *Melampsalta* Amyot, 1847 ? (Homoptera, Tibicnidae).- *Nouv. Revue. Ent. (N.S.)*, 8 (1), 1991: 25-28.  
 —, 1992.- Identité et bio-écologie de *Cicadatra atra* (Olivier, 1790), la Cigale noire in *Gallia primordia patria* (Hom. Cicadoidea, Cicadidae).- *EPHE, Biol. Evol. Insectes*, 5: 54-84.

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- BOULARD, M., 1993.- *Pagiphora yanni*, Cigale anatolienne inédite. Description et premières informations biologiques (cartes d'identité et d'éthologie sonore) (Hom. Cicadoidea, Tibicinidae).- *Nouv. Revue Ent.* (N.S.), **9** (4), 1992 (1993): 365-374.
- , 1993.- *Bafutalna mirei*, nouveau genre, nouvelle espèce de Cigale acymbalique (Hom. Cicadoidea, Tibicinidae).- *EPHE, Biol. Evol. Insectes*, **6**: 87-92. [avec des remarques sur les Cigales acymbaliques africaines et leur phylogénèse].
- BOULARD, M. & MONDON, B., 1996.- *Vies et Mémoires de Cigales. Provence, Languedoc, Méditerranée*. Barbenne, Équinoxe, Seconde édition revue et augmentée: 160p., 336 fig. et un CD (disque compact, 17 min.).
- BOULARD, M. & MARTINELLI, N.M., 1996.- Révision des Fidicini. Première partie: Sous-tribu nouvelle des Fidicinina.- *EPHE, Biol. Evol. Insectes*, **9**: 11-81.
- BUCHOZ, P. J., 1771a.- Liste des Insectes de Surinam, rapportés par Mademoiselle Merian et d'autres auteurs, et rangés selon le système de Linnaeus. Dans: Merian, M. S., *Histoire générale des Insectes de Surinam et de toute l'Europe*, 3ème édition, Desnos, Paris, **2**: 48-50.
- , 1771b.- Liste des Insectes de l'Europe, rangés selon le système de Linnaeus, avec un détail sur ceux dont Mademoiselle De Merian a parlé dans cette seconde Partie.- *Ibid.*: 51-71.
- BUCKTON, G. B., 1889.- Note on the classification of Cicadae.- *Entomologist*, **22**: 269-270. —, 1890.- Monograph of the British Cicadae or Tettigidae.- MacMillan ed., Lond., 1890, **1** (2): xvi + 32.
- BURMEISTER, H. C., 1835.- *Rhynchota*.- *Handb. Ent.*, **2** (1): 1-396.
- CHEN, Kia-Z., 1943.- New genera and species of Chinese Cicadas with synonymical and nomenclatorial notes.- *Jl N. Y. Ent. Soc.*, **51**: 19-52.
- CHINA, W. E., 1964.- Tibicinidae Van Duzee, 1916 (Insecta, Cicadoidea): proposed suppression under the plenary powers in favour of Platyleuridae Schmidt, 1918.- *Bull. zool. Nom.*, **21** (2): 154-160.
- CHINA, W. E. & FENNAH, R. G., 1945.- On the genera *Tetigonia* Geoff., *Tettigonia* F., *Tettigoniella* Jac., and *Iassus* Fabr. (Hemiptera-Homoptera).- *Ann. Mag. nat. Hist.*, (11) **12**: 707-712.
- C. I. N. Z., 1914.- The designation of genotypes by Latreille, 1810. Opinion 11, dans: Règles internationales de la Nomenclature zoologique adoptées par les Congrès internationaux de Zoologie.- *IX Cong. intl Zool.*, Monaco, 1913: 911.
- , 1924.- Opinion 79. Case of Lamarck (1801a) Système des Animaux sans Vertèbres.- *Smith. misc. coll.*, **73** (2): 15-16.
- , 1939.- Opinion 136. Opinion supplementary to Opinion 11 on the interpretation of Considérations générales sur l'ordre naturel des animaux composant les classes des Crustacés, des Arachnides et des Insectes avec un tableau méthodique de leurs genres disposés en familles, Paris, 1810.- *Opinions and Declarations rendered by the International Commission on Zoological Nomenclature*, **2**, 1939: 15-19.
- , 1954.- Opinion 322. Validation, under the plenary powers, of the generic name "Fulgora" Linnaeus, 1761 (Classe Insecta, Order Hemiptera) and designation for the genus so named of a type species in harmony with current nomenclatorial practice.- *Ibid.*, 1954: 187-203.
- , 1963.- Opinion 686. Amyot, Méthode mononymique: placed on the official index of rejected and invalid works in zoological Nomenclature.- *Bull. zool. Nom.*, **20** (6): 423.
- DAVIS, W. T., 1920.- North America cicadas belonging to the genera *Platypedia* and *Melampsalta*.- *Jl N. Y. Ent. Soc.*, **28**: 95-135.
- DISTANT, W. L., 1888.- Description of new species of Eastern Cicadidae in the Collection of the Museo civico of Genoa.- *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) **6**: 519-524.
- , 1889.- *Monograph of Oriental Cicadidae*, Part 1 & 2: 1-48.
- , 1904.- Rhynchotal Notes.- *XXXVII. Ann. Mag. nat. Hist.*, (7) **4**: 329-336.
- , 1905.- Rhynchotal Notes.- *XXX. Ibid.*, (7) **15**: 304-319.
- , 1905.- *Id.*, *XXXII. Ibid.*, (7) **15**: 478-486.
- , 1905.- *Id.*, *XXXIII. Ibid.*, (7) **16**: 22-35.
- , 1905.- *Id.*, *XXXV. Ibid.*, (7) **16**: 265-280.

- DISTANT, W. L., 1905.- Id., XXXVI. *Ibid.*, (7) 16: 553-567.  
 —, 1906.- *A synonymique Catalogue of Homoptera. Part I. Cicadidae.*- B.M., Lond.: 1-207.  
 —, 1912.- Homoptera Fam. Cicadidae, Subfam. Cicadinae.- *Genera Insectorum*, 142: 1-64.  
 —, 1920.- Some undescribed Ethiopian Cicadidae.- *Ann. Mag. nat. Hist.* (9) 5: 369-376.  
 DLABOLA, J., 1963.- Pinheya n. g. of Melampsaltini, discussion on near genera and faunistic notes on Rhodesian Cicadoidea (Homoptera Auchenorrhyncha).- *Pulcoes cult. Com. Angola*, 66: 45-53.  
 DUFFELS, J. P. & van der LAAN, P. A., 1985.- *Catalogue of the Cicadoidea (Homoptera, Auchenorrhyncha) 1956-1980.*- Junk Publ./S.E. 84, Dordrecht, 1985: i-xiv, 1-414. [Nota: also contains an update of the bibliography, untill the 31. XII. 1980].  
 DUGDALE, J. S., 1972.- Genera of New Zealand Cicadidae (Homoptera).- *N. Z. Jl Sci.*, 14 (4), 1971 (1972): 856-882.  
 DUMÉRIL, A. M., 1806.- Notes sur le N°167. XLIII<sup>e</sup> Fam. Collirostrés ou Auchénorinques, *in*: *Zoologie analytique, ou Méthode naturelle de classification des animaux, rendue plus facile à l'aide de Tableaux synoptiques.*- Allais, Paris, 1806: i-xxxii, 1-344 [266-267].  
 —, 1816.- Quarante-troisième Famille. Les Collirostrés ou Auchénorinques.- *Dictionnaire des Sciences naturelles*, 3, 1816: 303.  
 —, 1823.- Id., *in*: *Considérations générales sur la Classe des Insectes*, 1823: 219-220.  
 —, 1860.- Entomologie analytique. Quarante-deuxième famille: Auchénorhynques ou Collirostrés.- *Mém. Acad. Sci.*, 31 (2): 1044-1061.  
 EMELIANOV, A. F., 1964/1967.- Suborder Cicadinea (Auchenorrhyncha).- *in*: *Keys to the Insects of the European URSS*, 1: 421-551.  
 ERICHSON, W. F., 1848.- Homoptera.- *in*: Schomburkg, R., *Reisen in British Guiana*, 3: 533-1260.  
 FABRICIUS, J. C., 1775.- *Ryngota. Systema entomologiae* : 1-816.  
 —, 1794.- *Ryngota. Entomologia systematica emendata et aucta.*- 4: 1-472.  
 —, 1803.- *Rhyngota. Systema Rhyngotorum* : i-x, 1-34.  
 FENNAH, R. G., 1947.- A synopsis of Achilixiidae of the New World (Homoptera Fulgoroidea). *Ann. Mag. nat. Hist.*, (11) 13: 183-191.  
 FENNAH, R.G. & Hemming, F., 1954.- Voir C.I.N.Z., 1954.  
 FIEBER, F. X., 1872.- *Katalog der europäischen Cicadinen, nach Originalien mit Benützung der neuesten Literatur.*- Wien, 1872: i-iv, 1-19.  
 —, 1875.- Les Cicadines d'Europe d'après les originaux et les publications les plus récentes. Première partie. *Rev. Mag. Zool.*, 1875: 1-129; [manuscrit sauvé et traduit par F. Reiber];  
 —, 1876.- II. Fam. Cicadaea, Fieb. Stridulantia, Latr.- *Ibid.*, Deuxième partie: 13-111.  
 [GEOFFROY, E. L.], 1762.- *Histoire abrégée des Insectes qui se trouvent aux environs de Paris; dans laquelle ces animaux sont rangés suivant un ordre méthodique.*- I: i-xxviii, 1-523.  
 GEOFFROY, E. L., 1764.- Id. (Work carrying the name of his author).  
 GERMAR, E. F., 1830.- Species Cicadarum enumeratae et sub genera distributae.- *Thon Entomologisches Archiv*, 2 (2): 1-8 [37-44], 45-57..  
 —, 1834.- Observations sur plusieurs espèces du genre Cicada, Latr. *Silbermann, Revue ent.* 2: 49-82.  
 GODING, F. G. & FROGGATT, W. W., 1904.- Monograph of the Australian Cicadidae.- *Proc. linn. Soc. N. S. W.*, 1904: 561-670.  
 GOMEZ-MENOR ORTEGA, J., 1957.- Monografía de cicadidos de Espana (Homoptera).- *Mem. R. Acad. Cienc. exact. fis. nat.*, Madrid, 19: 1-87.  
 HAGEN, H. A., 1855.- Die Sing-Cicaden Europa's.- *Sett. Ent. Zgt.*, 16: 340-358.  
 HANDLIRSCH, A., 1925.- Ordnung: Homoptera (Latr.) Westw. (Homopteren); Systematische Übersicht (Schluss).- *in*: *Schröder's Handb. Ent.* 3 (17-18): 1117-1185.  
 HAUPT, E., 1935.- Unterordnung: Gleichflügler, Homoptera. 1. Überfamilie: Zikaden, Auchenorrhynchi Dum. (Cicadariae Latr., Cicadina Burm.). *Die Tierwelt Mitteleuropas*, 4 (3): 115-221.

## - Higher Taxonomy and Nomenclature of the Cicadoidea -

45

- HAYASHI, M., 1984.- A review of the Japanese Cicadidae.- *Cicada, Tokyo*, **5**: 25-75 [en japonais, intitulés et résumé en anglais].
- , 1987.- A Revision of the Genus *Cryptotympana* (Homoptera Cicadidae). Part I.- *Bull. Kitakyushu Mus. Nat. Hist.*, **6**:119-212.
- HORVÁTH, G., 1911.- Nomenclature des Familles d'Hémiptères. *Annls Hist. nat. Mus. natn. hung.*, **9**: 1-34.
- , 1912.- *Miscellana hemipterologica*. X. *Cicadarum genera palaeartica*.- *Ibid.*, **10**: 602-606.
- , 1926.- Les noms génériques de nos trois grandes Cigales indigènes.- *Ibid.*, **23**: 93-98.
- ISHIHARA, T., 1961.- Hemiptera: Cicadidae.- *Insecta japonica* **1** (2): i-ii, 1-35.
- JACOBI, A., 1907.- *Homoptera Andina*. Die Zikaden des Kordillerengebietes von Südameika nach Systematik und Verarbeitung. I. Cicadidae. *Abh. Ber. zool. anthrop.-ethn. Mus. Dresden*, **11**: 1-28.
- KATO, M., 1932.- *Monograph of Cicadidae*:- 1-450 [en japonais, intitulés en anglais].
- , 1954.- On the classification of Cicadoidea. *Kontyû*, **21**: 97-99 [id.].
- , 1956.- *The Biology of Cicadas*.- Iwasaki Shoten publ., Tokyo: 1-3 [id.].
- KIRKALDY, G. W., 1900.- On the nomenclature of the genera of the Rhynchota, Heteroptera and auchenorrhynchous Homoptera.- *Entomologist*, **33**: 25-28.
- , 1900.- Bibliographical and nomenclatorial notes on the Rhynchota, N° 1.- *Ibid.*, **33**: 238-243.
- , 1901.- On the nomenclature of the genera of the Rhynchota, Heteroptera and Auchenorrhynchous Homoptera.- *Ibid.*, **34**: 176-179.
- , 1901.- Some systematic work published during the last five years upon North American Auchenorrhynchous Homoptera (Rhynchota).- *Ibid.*, **34**: 336-340.
- , 1903.- On the nomenclature of the genera of the Rhynchota; Heteroptera and Auchenorrhynchous Homoptera.- *Ibid.*, **36**: 230-233.
- , 1906.- Leaf-Hoppers and their natural enemies. (Pt.IX.Leaf-Hoppers-Hemiptera).- *Bull. Div. Ent., Hawaiian Sug. Plrs' Ass.*, **1** (9): 271-479.
- , 1906.- Current notes.- *Entomologist*, **39**: 283-287.
- , 1907.- Leaf-Hoppers. Supplement (Hemiptera).- *Bull. Div. Ent., Hawaiian Sug. Plrs' Ass.*, **3**: 5-186, i-iii.
- , 1908.- Bibliographical and nomenclatorial notes on the *Hemiptera*. N°9.- *Entomologist*, **41**: 188-189.
- , 1909.- *Hemiptera*, old and new, N° 2.- *Canad. Entomol.*, **41**: 388-392.
- , 1909.- *Catalogue of the Hemiptera (Heteroptera) with biological and anatomical references, lists of foodplants and parasites, etc. Prefaced by a discussion on Nomenclature and analytical table of families. Vol. I: Cimicidae*.- Dames, Berlin, 1909.
- KOLENATI, F., 1857.- *Homoptera* Latreille. Leach. *Gulaerostria* Zetterstedt.- *Bull. Soc. imp. Nat., Moscou, sect. biol.*, **30**: 399-429.
- , 1857.- *Homoptera* Latreille. Leach. *Gulaerostria* Zetterstedt.- *Meletemata Ent.*, **7**: 1-36.
- LALLEMAND, V., 1928.- Liste d'Homoptères du Portugal recueillis par Mr de Seabra.- *Mem. e Estud. Univ. Coimbra* (1), **28**: 1-10.
- LAMARCK, J. B., 1801.- *Système des Animaux sans vertèbres*.- Deterville, Paris, 1801: viij + 432pp.
- LAMEERE, A., 1935.- *Hémiptères*.- *Précis de Zoologie*.- Doin, Paris, **4**: 383-458.
- LATREILLE, P. A., 1796.- *Précis des caractères génériques des Insectes, disposé dans un ordre naturel*.. Bordeaux, Brive: xiii + 202pp.
- , 1802.- Famille troisième. Cicadaires; *Cicadariae*.- *in: Histoire naturelle, générale et particulière des Crustacés et des Insectes... Familles naturelles des genres*.- Dufart, Paris, **3**: 256-263.
- , 1804.- Division seconde. Famille quarante-huitième. Cicadaires; *Cicadariae*.- *Ibid.*, **12**: 293-337.
- , 1807.- *Sectio secunda, Familia quarta. Cicadariae. Cicadaires*.- *Genera Crustaceorum et Insectorum*, Koenig, Paris, **3**: 152-168.

- LATREILLE, P. A., 1810.- Section II. Homoptères. Homoptera. Famille IV. Cicadaïres; Cicadariae.- in: *Considérations générales sur l'ordre naturel des animaux composant les classes des Crustacés, des Arachnides, et des Insectes; avec un tableau méthodique de leurs genres, disposés en Familles*.- Schoell, Paris, 1810: 262-264, 434.
- , 1825.- Seconde section. Homoptères. Homoptera. Troisième Famille. Cicadaïres; Cicadariae.- in: *Familles naturelles du Règne animal, exposées succinctement et dans un ordre analytique; avec l'indication de leurs genres*.- Baillière, Paris: 426-428.
- , 1829.- Des Cicadaïres ou des Cigales en général (Cicadariae).- in: Cuvier, *Le Règne animal distribué d'après son organisation, pour servir de base à l'Histoire naturelle des Animaux et d'introduction à l'anatomie comparée. Suite et fin des Insectes*.- Déterville, Paris, 5: i-xxiv, 1-556.
- LEACH, J. G., 1815.- Entomology.- *Brewster's Edinbg. Encycl.*, 9: 57-172.
- LINNÉ, C., 1758.- Hemiptera. *Systema Naturae... Editio decima, reformata*, 1: 1-824.
- , 1764.- Museum S:ae R:ae M:tis Ludovicae Ulricae Reginae Svecorum Gothorum, Vandalorumque: i-viii, 1-720 [152,155].
- , 1767.- Hemiptera. *Systema Naturae... Editio duodecima, reformata*, 1 (2): 533-1327.
- MATSUMURA, S., 1939.- On the genus Lyristes Horvath and two new species of Cicadidae.- *Ins. Mats.*, 13 (2): 47-51.
- MELICHAR, L., 1896.- *Cicadinen (Hemiptera - Homoptera) von Mittel-Europa*.- Dames, Berlin: xxvii + 364pp.
- MELVILLE, R.V. & SIMS, R.W., 1984.- Tibicina Amyot, 1847 and Lyristes Horvath, 1926 (Insecta, Hemiptera, Homoptera): proposed conservation by the suppression of Tibicen Berthold, 1827. *Bull. zool. Nom.*, 41 (3): 163-166, 179-181.
- MERIAN, Marie S. de, 1771.- *Histoire générale des Insectes de Surinam et de toute l'Europe*. Troisième édition revue et augmentée par P. J. Buchoz.- Desnos, Paris: 48-71.
- METCALF, Z. P., 1939.- Hints on bibliographies.- *Jl Soc. Bibliophy nat. Hist.*, 1 (9): 241- 248.
- , 1951.- Phylogeny of the Homoptera Auchenorrhyncha.- *Commentat. Biol.* 12 (1): 1-14.
- , 1955.- New names in the Homoptera.- *Jl Wash. Acad. Sci.*, 45 (8): 262-267.
- , 1962.- *A Bibliography of the Cicadidae (Homoptera: Auchenorrhyncha)*. N.C. State College publ., Raleigh : iv + 229pp.
- , 1963.- Cicadoidea.- General Catalogue of the Homoptera, 8 (1). *Ibid.*: vii + 919pp.
- , 1963.- *Id.*, *Ibid.*, 8 (2): vi + 492pp.
- MOULDS, M., 1988.- The statut of Cicadetta and Melampsalta (Homoptera : Cicadidae) in Australia with the description of two new species.- *Gen. appl. Ent.*, 20: 39-48.
- , 1990.- *Australian Cicadas*.- Kensington NSW Univ. Press, 217pp.
- MÜLLER, O. F., 1764.- Ordo II. Hemiptera. *Fauna Insectorum Fridrichsdalina*, 1764: xix + 96pp.
- MURAY, A. J., 1890.- See Buckton, G.B.. 1890.
- MYERS, J. G., 1928.- Cicadidae.- *Insects of Samoa and other Samoan terrestrial Arthropoda*, 2 (2): 55-65.
- , 1929.- *Insect Singers. A Natural History of the Cicadas*. Routledge, London: xix + 304pp.
- NAST, J., 1972.- *Palaeartic Auchenorrhyncha (Homoptera), an annotated checklist*.- Polish Scientific Publ., Warszawa, 1972: 550pp.
- NAST, J., 1979.- *Id.* Part 2. Bibliography; Addenda and Corrigenda.- *Annls Zool. Warsz.*, 34 (18): 481-499.
- NEL, A., 1996.- Un Tettigarctidae fossile du Lias européen (Cicadomorpha, Cicadoidea, Tettigarctidae).- *EPHE, Biol. Evol. Insectes*, 9: 83-94
- OLIVIER, G. A., 1790.- Cigale, Cicada. *Encycl. méth., Hist. nat. Ins.*, 5: 735-760.
- ORIAN, A. J. E., 1963.- A new genus of Cicadidae (Homoptera) from the island of Rodrigues with notes on the nomenclature of the family.- *Ann. Mag. nat. Hist.*, (13) 6: 321-328.
- OSHANIN, V. T., 1908.- Verzeichnis der palaearktischen Hemipteren mit besonderer Berücksichtigung ihrer verteilung im Russischen Reiche. II. Homoptera.- *Ann. Mus. zool. Acad. Imp. Sci.*, 13: 385-492.

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- OSHANIN, V. T., 1912.- *Katalog der paläarktischen Hemiptera (Heteroptera, Homoptera-Auchenorrhyncha und Psylloidea)*.- Friedländer, Berlin, 1912: xvi + 187pp.
- PALLAS, P. S., 1773.- *Reise durch verschiedene Provinzen der Russischen Reichs*.- 1: 744pp.
- POCHE, F., 1933.- Ueber den nomenklatorischen Status der Gattungsnamen in Latreille "Familles naturelles du Règne Animal" im allgemeinen und über den giltigen Gattungsnamen für *Cicada plebeja* Scop. im besonderen.- *Konowia*, 1: 326-331;
- PUTON, A., 1875/1899.- *Homoptera*. Am. Serv. (*Gulaerostria*. Zett. Fieb.) Sect.I. *Auchenorrhyncha*. Dumér. (*Cicadina*. Burm.).- in: *Catalogue des Hémiptères (Hétéroptères, Cicadines et Psyllides) d'Europe et du Bassin de la Méditerranée*.
- RAMBUR, J. P., 1840.- Seconde section des Hémiptères. Les Homoptères. Latreille.- *Faune entomol. Andalousie*, 5: 177-304.
- RÉAUMUR, R.-A. F. de, 1740.- Quatrième Mémoire. Sur les Cigales; et sur quelques mouches de genres approchant du leur.- in: *Mémoires pour servir à l'Histoire des Insectes*, 5: 145-206.
- RIBAUT, H., 1936.- Homoptères Auchénorhynques. I (*Typhlocybidae*). *Faune de France*, 31: 1-229.
- SCHUMACHER, F., 1922.- Nomenklatorische Notizen zu paläarktischen Cicadinen.- *Deut. ent. Ztschr.*, 1922: 210-213.
- SCOPOLI, I. A., 1763.- *Entomologia carnolica exhibens Insecta carnioliae indigena et distributa in ordines genera, species, varietates. Methodo linnaeana*. Vindobonae: xxxii + 423pp.
- , 1772.- Observations Zoologicae.- *Annus Hist.-nat.*, 5: 70-125.
- SERVADEI, A., 1967.- *Rhynchota (Heteroptera, Homoptera Auchenorrhyncha)* Catalogo topografico e sinonimico.- *Fauna d'Italia*, Calderini, Bologna, 9: x + 851 pp.
- SILVESTRI, F., 1934.- Subordo *Homoptera*.- *Compendio di Entomologia applicata (agraria-forestale-medica-veterinaria)*. Parte speciale, 1, Portici: 1-448.
- STÅL, C., 1858.- Neue Systematische Eintheilung der Homopteren.- *Sett. ent. Ztg.*, 19: 233-234.
- , 1861.- *Genera nonnulla Cicadinarum*.- *Annls Soc. ent. Fr.*, (4) 1: 613-622.
- , 1865.- *Hemiptera nova vel minus cognita*. *Ofv. Svenska Vet. Akad. Förh.*, 22: 145-165.
- , 1869.- *Hemiptera-Homoptera* Latr. *Hemiptera Fabriciana*, 2. *Handl. Svenska Vet.-Akad.*, 8 (1): 1-130.
- STEPHENS, J. F., 1829.- Ordo VII : (14). *Homoptera*, Leach.- *A systematic catalogue of British Insects*, London, 2: 1-388.
- STOLL, C., 1788.- *Représentation exactement colorée d'après nature des Cigales, qui se trouvent dans les quatre parties du Monde, l'Europe, l'Asie, l'Afrique et l'Amérique*.- Christiaan, Amsterdam: 1-124, 29 pl.
- STRÜMPFEL, H., 1983.- *Homoptera* (Pflanzensanger).- *Handb. zool.*, 4 (28): vi + 222pp.
- TILLYARD, D., 1926.- Suborder *Homoptera* (Cicadas, Plant-hoppers, Plant-lice, Scale In-sects).- in: *The Insects of Australia and New Zealand*, Angus & Robertson, Sydney: 158-175.
- TORRES, B. A., 1945.- Revision de los géneros *Chonosia* Dist., *Mendozaana* Dist., y *Derotettix* Berg y algunas interesantes notas cicadológicas (Homoptera-Cicadidae).- *Not. Mus. La Plata*, 10, Zool. 83: 55-82.
- UHLER, P. R., 1861.- Description of four species of *Hemiptera* collected by the North-Western Boundary Survey.- *Proc. Acad. Nat. Sci. Philadelphia*, 13: 284-286.
- , 1888.- Preliminary survey of the *Cicadidae* of the United States.- *Ent. Am.*, 4: 21-23.
- Van DUZEE, E. P., 1912.- Hemipterological gleanings.- *Buffalo N. Y. Soc. nat. Sci.*, 10: 477-512.
- , 1914.- Nomenclatural and critical notes on *Hemiptera*.- *Canad. Ent.*, 46: 377-389.
- , 1915.- A preliminary review of the West Coast *Cicadidae*.- *Jl N. Y. ent. Soc.*, 23: 21-44.
- , 1916.- Sect. *Auchenorrhyncha* A. & S. 1843, in: *Check list of Hemiptera (excepting the Aphididae, Aleurodidae and Coccidae) of America North of Mexico*, 1916: 55-85.
- , 1917.- Series *Auchenorrhyncha* Dum. Family *Cicadidae* (Latr.). Catalogue of the *Hemiptera* of America North of Mexico excepting the Aphididae, Coccidae and Aleurodidae.- *Bull. Ent. Techn. Calif. Expt. Sta.*, 2: 487-506.

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- Van DUZEE, E. P., 1927.- On the standing of genus Tibicen Latr.- *Pan-Pacif. Ent.*, **4**: 47.
- WALKER, F., 1850.- Synonyms of the genera, in: *List of the specimens of Homopterous Insects in the collection of the British Museum*, **1**: 257-260.
- , 1852.- Supplement. *List of the specimens of Homopterous Insects in the collection of the British Museum*, **4**: 1119-1168.
- , 1858.-*List of the specimens of Homopterous Insects in the collection of the British Museum, Supplement*: 307pp.
- WATTL, J., 1837.- Beschreibungen zweyer neuer Gattungen aus Andalusien.- *Isis*, 1837: 288.
- WEBB, M. D., 1979.- Revision of Rambur's Homoptera species from the types in the British Museum.- *Anns Soc. ent. Fr. (N.S.)*, **15** (1) : 227-240.
- WESTWOOD, J. O., 1840.- Cicadidae.- in: *An introduction to the modern classification of Insectes; founded on the natural habits and corresponding organisation of the different families*, Longman, London, **2**: 420-427.
- WHITE, A., 1845.- Description and figures of four new species of Australian Insects.- in: Eyer, E. J., *Journals of Expedition of Discovery into Central Australia, and overland from Adelaide to King George's Sound, in the years 1840-1*, **1**, Appendix: 412-413.

