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# Note on the nomenclature and generic composition of the Ichnestomina Burmeister, 1842 (Coleoptera: Scarabaeidae, Cetoniinae)

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**Abstract**
On the basis of its overwhelming use in the literature over the past 100 years, it is here suggested that a reversal of precedence be applied to preserve the prevailing usage of the subtribal name "Ichnestomina" Burmeister, 1842 against the more technically correct but virtually ignored "Ichnestomatina". As none of the key symplesiomorphic characters of the Ichnestomina type genus *Ichnestoma* Gory & Percheron, 1833 and its related genera are shared with *Paraxeloma* Holm 1988, it is also proposed that this latter genus be removed from the Ichnestomina and reincorporated into the subtribe Cetoniina Leach, 1815, or alternatively into the Goliathina Griffith & Pidgeon, 1832.

**Keywords**: Fruit Chafers, Goliathini, Afrotropical Region, southern Africa, International Code of Zoological Nomenclature.

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## Introduction

In the wake of the recent publication of the revision of the Ichnestomina Burmeister, 1842 by Perissinotto (2020) a few queries and arguments have been posed regarding the correctness of the name and composition of this subtribe. In terms of compliance with the International Code of Zoological Nomenclature (ICZN), Article 29 directs that Family-group names must be formed using a stem based on the type genus and a suffix for the appropriate family-group rank. In the case of the subtribe in question, the correct suffix "–ina" is obvious but the stem from the type genus *Ichnestoma* Gory & Percheron, 1833 is not a straightforward one but rather "Ichnestomat-" (cf. e.g. Smith 2006; Bouchard et al. 2011). This has presumably caused some confusion and maybe even reluctance, given its strangeness and difficult pronunciation, towards the initial adoption and regular use of this name by the Cetoniinae group specialists and taxonomists. As a result, since the first introduction of the subtribes in family-group systematics of this subfamily (Schenkling 1921), the name used by specialists in virtually every review, revision and catalogue has not been Ichnestomatina but Ichnestomina.

Like many other family-groups, this subtribe has also undergone a remarkable "evolution" in terms of the genera that were initially included in it and subsequently replaced, removed or added. Schenkling (1921) started off with 14 genera, but most of them were eventually moved to other tribes and subtribes, or synonymised with other genera. In two more recent revisions, only *Gariep* Péringuey, 1907, *Ichnestoma* Gory & Percheron, 1833 and *Paraxeloma* Holm, 1988 have been included in it (Krajcik 1998; Beinhundner 2017). However, in the latest revision Perissinotto (2020) while erecting two new genera, *Karooida* Perissinotto, 2020 and *Mzansica* Perissinotto, 2020, for species previously grouped together with *Ichnestoma,* excluded *Paraxeloma* from this subtribe.

A review of both nomenclature and composition of this subtribe is, therefore, undertaken here below with the specific purpose of clarifying the issues raised and attaining consensus on the approach to use in this taxonomic area going forward.

## Literature survey

In summary, during the past 100 years a total of 11 specific taxonomic works, as reported in the list here below, have mentioned the subtribe as Ichnestomina on at least 30 occasions within the text (Schenkling 1921; Schein 1960;

Krikken 1984; Allard 1991; Krajcik 1998; Sakai & Nagai 1998; Ŝípek et al. 2008; Malec & Ŝípek 2017; Beinhundner 2017; Kouklík 2017; Perissinotto 2020). Conversely, during the same time, only two technical reviews of family-group names and one MSc thesis on larval phylogenesis have mentioned the subtribe Ichnestomatina, and only once in each (Smith 2006; Bouchard et al. 2011; Kouklík 2017).

According to Article 29.5 (Maintenance of current spellings) of the ICZN, "If a spelling of a family-group name was not formed in accordance with Article 29.3 but is in prevailing usage, that spelling is to be maintained, whether or not it is the original spelling and whether or not its derivation from the name of the type genus is in accordance with the grammatical procedures in Articles 29.3.1 and 29.3.2". Therefore, given the current and historical status of the name for this subtribe, it is here suggested that a reversal of precedence be applied to preserve the prevailing usage of the name "Ichnestomina" against the more technically correct but virtually ignored "Ichnestomatina". Here below is a list of all the major systematic works published during the last 100 years, in which the subtribe name has been used, the genera included in each and the context thereof.

**USAGE OF ICHNESTOMINA AND ICHNESTOMATINA DURING THE LAST 100 YEARS**

**Schenkling 1921: 75 (First use of subtribal categories in the Cetoniinae)**
"9. Subtribus. Ischnostomina". Including the genera: *Aporecolpa, Badizoblax, Bietia, Gariep, Haematonotus, Heteroclita, Hypselogenia, Ischnostoma, Lansbergia, Lipoclita, Phonopleurus, Rhinocoeta, Rhyxiphloea, Xiphoscelis*.

**Schein 1960: 88 (Survey limited to South Africa)**
"Subtribus ISCHNOSTOMINA". Including the genera: *Hypselogenia, Ischnostoma, Rhinocoeta, Mazoe, Heteroclita*.

**Krikken 1984: 37, 56, 64 (Global revision of subfamily)**
"ICHNESTOMINA stat. rev. ( = ISCHNOSTOMINA auctorum) P?". Including the genera: *Gariep* Peringuey, 1907; *Ichnestoma* Gory & Percheron, 1833 ( = *Ischnostoma* auctorum).

**Allard 1991: 10, 42, 46 (Illustrated African atlas)**
"Sous-tribu Ischnostomina". Including the genera: *Hypselogenia*; *Ischnostoma*.

**Sakai & Nagai 1998: 205, 378 (World iconographic monograph)**
"Subtribe Ichnestomina". Including the genera: *Gariep*; *Ichnestoma.*

**Krajcik 1998: 4 (World catalogue)**
"Subtribe Ichnestomina". Including the genera *Gariep, Ichnestoma* and *Paraxeloma.*

**Smith 2006: 181 (General nomenclatural review)**
"Subtribe ICHNESTOMATINA Burmeister, 1842 Original spelling and citation: Ischnostomidae Burmeister 1842: 600 Type genus: *Ichnestoma* Gory and Percheron, 1833: 41".

**Ŝípek et al. 2008: 409 (Larval review and description)**
"Subtribes Ichnestomina". Including only *Ichnestoma pringlei* Perissinotto et al., 1999.

**Bouchard et al. 2011: 44 (General nomenclatural review)**
"Subtribe Ichnestomatina Burmeister, 1842"

**Malec & Ŝípek 2017: 53 (South African survey report)**
"Subtribe: Ichnestomina". Including only genus *Ichnestoma.*

**Beinhundner 2017: 1142 (Illustrated catalogue on Africa)**
"Subtrib Ichnestomina Gory & Percheron". Including the genera: *Ichnestoma*; *Paraxeloma.*

**Kouklík 2017: 14, 48, 49, 50, 53, 54, 58, 59 (Tab 5), 61, 62, 63, 67, 74 (Annx 1), 75 (Annx 2) (Global phylogenetic study)**
"Ichnestomina". Including the genera: *Ichnestoma.* "Ichnestomatina" – used only once on p. 14, under section titled "3.1.3 Tribus Goliathini".

**Perissinotto 2020: 217, 317, 318 (Subtribal revision)**
"Subtribe Ichnestomina (sensu Krikken, 1984)". Including the genera: *Gariep*, *Ichnestoma*, *Karooida*; *Mzansica*.

## Subtribal composition

The latest revision of the subtribe has included only the long established genera *Gariep* (Fig. 1 A) and *Ichnestoma* (Fig. 1 B), as well as two newly erected genera previously clustered within *Ichnestoma*, i.e. *Karooida* (Fig. 1 C) and *Mzansica* (Fig. 1 D) (Perissinotto 2020). In this work, the genus *Paraxeloma* (Fig. 1 E) has been excluded from the Ichnestomina. This monospecific genus, which currently comprises only the species *P. mashuna* (Péringuey, 1907), was actually first erected as a subgenus of *Xeloma* Kraatz, 1881 by Holm (1988) (Fig. 1 F), who eventually upgraded it to full genus on the basis of five diagnostic characters of differentiation from *Xeloma* (Holm & Marais 1992). Holm & Marais (1992: 312) used a reductionist approach for family-groups, recognizing only five subtribes within the subfamily Cetoniinae and included *Paraxeloma* in the subtribe Goliathina, rather than in the Cetoniina with its "sister" genus *Xeloma*. The subtribe Ichnestomina does not appear in their systematic account. Nevertheless, both

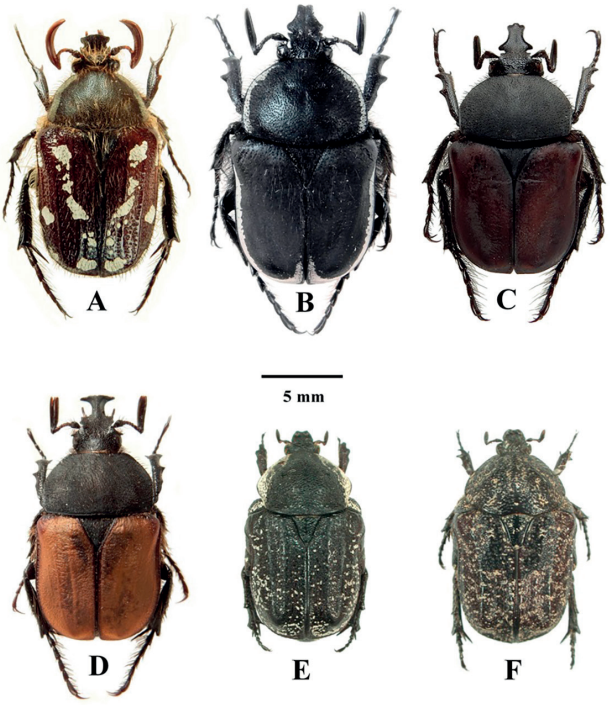


**Fig 1 –** Representative species of the Ichnestomina and of the genera *Paraxeloma* and *Xeloma*. **A**) *Gariep patera* ♂ (Gory & Percheron, 1833); **B**) *Ichnestoma cuspidata* ♂ (Fabricius, 1787); **C**) *Karooida struempheri* ♂ (Holm & Perissinotto, 2004); **D**) *Mzansica stobbiai* ♂ (Holm, 1992); **E**) *Paraxeloma mashuna* ♀ (Péringuey, 1907); **F**) *Xeloma maura* ♂ (Boheman, 1860). (Photos: **A-D** by Lynette Clennell; **E, F** by Gerhard Beinhundner).

Krajcik (1998) and Beinhundner (2017) regarded the "*Goliathus*-type" character of a pronotal base extremely attenuated, as described in Holm & Marais (1992: 20) for the genus *Paraxeloma*, as sufficient to include it in the Ichnestomina. This character, however, appears to have very little to do with the Ichnestomina, and even less do the other key characters that differentiate this genus from *Xeloma*. Indeed, many of these appear to be of an adaptive nature rather than of phylogenetic significance. Specifically, the general globose habitus of *P. mashuna* (Fig. 1B), its blade-like mesometasternal process, ventrodistally extended metatibia and the median denticle on the ventral side of the profemur are characters reflecting the fossorial and myrmecophilous habits of this species (pers. obs.). Furthermore, although *P. mashuna* exhibits a "*Goliathus*-type" pronotal morphology, none of the key symplesiomorphic characters of the Ichnestomina type genus *Ichnestoma* and related genera are shared with *Paraxeloma*. These include extreme sexual dimorphism, with brachypterous females exhibiting reduced morphology, males with armoured clypeus and hypertrophic legs and antennal clubs (Figs 1 A-D), as well as uniquely specialized aedeagal structure (Holm 1992; Perissinotto 2020), none of which are found in *Paraxeloma* (Fig. 1 E). Actually, the aedeagal parameres of *P. mashuna*, although slightly more elongate than in the typical *Xeloma* species, are very similar to those of the *X. leprosa* (Burmeister, 1842) cluster, in that they all show a strong angulation in the outer posterior corners, as well illustrated for instance in Holm & Marais (1992: 21, fig. 4a; 188, fig. 104a). Therefore, it is hereby proposed that the genus *Paraxeloma* should be reallocated into the Cetoniina Leach, 1815 within a clade shared with its sister genus *Xeloma* and possibly also *Tephraea* Burmeister, 1842 and *Polystalactica* Kraatz, 1882. Alternatively, if it can be proved through molecular DNA analyses that the "*Goliathus*-type" pronotal morphology of *Paraxeloma* is indeed of predominant phylogenetic significance, then the genus may be included in the Goliathina Griffith & Pidgeon, 1832.

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