RESOLVING A BRANCHING TAXONOMY CONUNDRUM—
CAN ONE SPECIES BE IN TWO PLACES AT ONE TIME UNDER THE SAME NAME
(COLEOPTERA: ZOPHERIDAE: COLYDIINAЕ AND TENEBRIONIDAE)?

MICHAEL A. IVIE
Montana Entomology Collection, Marsh Labs, Room 50
Montana State University
Bozeman, MT 59717, U.S.A.
mivie@montana.edu

NATHAN P. LORD
Department of Biology, Brigham Young University
Provo, UT 84602, U.S.A.

AND

MARIO ELGUETA
Museo Nacional de Historia Natural
Parque Quinta Normal, Santiago, CHILE

ABSTRACT

The tortured nomenclatural history of the Chilean species *Endophloeus flexuosus* Solier, 1849 and *Endophloeus angustatus* Solier, 1851 is reviewed. These species have had dual parallel and independent histories as members of the Zopheridae: Colydiinae and Tenebrionidae. The genus *Phloeopsidius* Gebien, 1925 was proposed for these two species in the Tenebrionidae. *Phloeopsidius regularis* Kulzer, 1966 and *Phloeopsidius collaris* Kulzer, 1966 were later added to the genus, also as Tenebrionidae. While concurrently treated as colydiines, the two Solier species have been treated in a variety of genera, most recently as *Sparactus flexuosus* and *Endophloeus angustatus*. *Phloeopsidius* is removed from the Tenebrionidae and placed as a new synonym of *Pristoderus* Hope, 1840 in the colydiine Zopheridae. The four species are all correctly placed in the Colydiinae, as *Notocoxelus angustatus* (Solier), new combination, *Pristoderus flexuosus* (Solier), combination revalidated, *Pristoderus regularis* (Kulzer), new combination and family placement, and *Pristoderus collaris* (Kulzer), new combination and family placement.

Key Words: taxonomy, *Endophloeus*, *Phloeopsidius*, *Notocoxelus*, *Pristoderus*

In preparation of a key to New World Colydiinae (Zopheridae) by the first two authors, and an independent query by the third, a complex nomenclatural problem was uncovered that involves a single set of species names being maintained in the literature under different generic names, in two different families, without reference to one another, for nearly a century. We take this opportunity to resolve (rather than continue to compound) this complex nomenclatural issue. As a convention in the discussion below, please note that prior to Ślipiński and Lawrence (1997), one of the family-group taxa involved was known as the Colydiidae. This group was reduced to the subfamily Colydiinae in the Zopheridae by Ślipiński and Lawrence (1997). In order to make the discussion below easier to follow and to relate correctly to the literature cited in its time frame, usage will follow that used in the citation involved, so that actions before 1997 use Colydiinae/colydiine and for those from 1997 and thereafter we use Colydiinae/colydiine. This is not a rejection of the current classification, but it is simply used to avoid repeated explanations in the text.

In the beginning, we start with confusion. In the mid-1800s, Solier described two Chilean species in the European Colydiidae genus *Endophloeus Dejean — Endophloeus flexuosus* Solier and *Endophloeus angustatus* Solier. The exact dates have been misunderstood and misreported ever since. The names both appeared in Solier (1851), part of a text volume of Gay’s great multivolume work on the physical and political history of Chile. This publication has universally been considered the source of both these names. The description of the first species is detailed and cites a well-illustrated plate in an accompanying Atlas, but the second species has no illustrations and a reduced description. The dating of that accompanying Atlas causes the first confusion in this group. On the twentieth of a series of 32 plates drawn by Blanchard...
and dated (and usually cited) as 1854, Solier gave the name *Endophloeus flexuosus* to fig. 9. Alonso-Zarazaga and Lyal (1999) and Alonso-Zarazaga (2012) noted that the wrapper on this series of 32 plates is actually dated 1849, not 1854 as elsewhere cited. Thus, the name *Endophloeus flexuosus* dates to a description by indication (see ICZN 1999, Art. 12.2.7) in Solier (1849), not Solier (1851), the latter being where a written description of that species and a brief written description for *E. angustatus* first appeared. Therefore, the dates of publication of these two species are deemed 1849 for *E. flexuosus* and 1851 for *E. angustatus*.

Lacordaire (1854), based on these publications, moved (or suggested moving, see Germain 1892) *E. flexuosus* to *Bolitophagus* Illiger, 1800, a member of the Tenebrionidae, but left *E. angustatus* behind by omission. Philippi (1887), in his catalog of Chilean beetles, treated both species as *Bolitophagus*. Next, Germain (1892) agreed with Lacordaire that Solier’s (1849) illustration and description (Solier 1851) indicated heteromeres, but stated that this assertion was in fact an error by Solier. Germain (1892) clearly stated that both species are tetrameros and members of the Colydiidae. Based on this and an antennal club composed of three antennomeres, he moved *E. flexuosus* to *Sparactus* Erichson, 1845, previously an exclusively Australian genus and at that time in the Colydiidae.

What led Germain to conclude Solier’s specimens were tetrameros? In the Museo Nacional de Historia Natural, Santiago, Chile (MNNC), there is a series of specimens from Germain’s period, the first of them labeled by Germain as *Pristoderus flexuosus* (Sol. in Gay 1722) (two handwritten labels by Germain; one label with the genus name, a second label with the specific epithet, author, and number from Germain’s 1911 catalog). The specimens (see Fig. 1 for an example) match the illustration by Solier in all details except for the stylized legs and 5–5–4 tarsi. Thus, it seems that Germain had access to specimens that were matches to Solier’s (1849) figure 9 (including 9a–g) and reported from those.

Germain (1892) further noted that, based on the two-segmented antennal club, Solier’s other species belonged to a different genus and moved *E. angustatus* back to *Endophloeus* (from *Bolitophagus*). Again, there is a series of specimens identified as *E. angustatus* by Germain in the MNNC that match the brief description of Solier (1851). There are again two identification labels handwritten by Germain that read *Endophloeus angustatus* Sol. in Gay 289 (the first label with the genus name, the second label with the specific epithet, author, and catalog number). According to Zoological Record for 1892 (Sharp 1893), however, Germain moved only *E. flexuosus*, as Sharp makes no mention of *E. angustatus*.

Germain (1911), publishing on the beetles in the MNNC, moved his species number 1722, *E. flexuosus*, to *Pristoderus* Hope, 1840 (then Colydiidae). Again, Germain’s action was missed by the 1911 Zoological Record (Sharp 1912). Possibly because of Zoological Record’s omission, Hetschko (1930) followed Germain (1892), not Germain (1911), and listed *E. flexuosus* in *Sparactus*. However, Hetschko did not mention *E. angustatus* in any genus.

With his earlier placement in *Sparactus*, Germain (1892) was the first person to recognize the existence of this Australian genus in south temperate South America, and with this action he was the first to notice the similarity of *Sparactus* and *Pristoderus*, but no one took note at the time. Not until *Sparactus* was synonymized with *Pristoderus* by Śliński and Lawrence (1997) did the existence of this group in the New World enter the colydid literature, and Germain’s insight has been missed until now. One additional item supporting this placement is Solier’s (1849) figure 9b, in which there is a labium without palpi, a characteristic of the MNNC specimens that Germain examined. Whether Germain noticed that or not is unrepor ted, and the absence of labial palpi did not in fact enter the literature for this group of colydiids until noted by Śliński and Lawrence (1997) in the same paper in which they moved the Colydiidae to the Zopheridae as the Colydiinae.

On a divergent and parallel track, Gebien (1925) described the Chilean genus *Phloeopsidius* in an article on Indo-Malayan tenebrionids (you cannot make this stuff up!), designating the Chilean *E. flexuosus* as the type species of the new tenebrionid genus. In a single trailing sentence, Gebien stated that *E. angustatus* also belonged in *Phloeopsidius*. Gebien apparently was unaware of Germain’s (1892) actions, stating he was moving these species from *Bolitophagus* (Tenebrionidae). Gebien listed the author of the species as “Solander,” a mistake followed by Zoological Record (IBE 1926). In a continuation of what was becoming a tradition, Gebien’s transfer of *E. angustatus* was also missed in the Zoological Record (IBE 1926), which only mentioned *Phloeopsidius flexuosus*. No notice of the move of *E. flexuosus* was made in the Colydiidae part of the 1925 Zoological Record (IBE 1926), and again, as a probable result, this was missed by Hetschko (1930). Both species were then treated as *Phloeopsidius* in Gebien’s (1939) catalog, using the ambiguous and fitting author name of “Sol.” for both. In 1966, Kulzer described *Phloeopsidius collaris* Kulzer and *Phloeopsidius regularis* Kulzer, both also from Chile. These species were listed in Peña’s (1966) catalog of the Tenebrionidae of Chile in *Phloeopsidius*, along with both *E. flexuosus* and *E. angustatus*. 
Figs. 1–4. *Pristoderus* species and *Notocoxelus angustatus*, habitus. 1) *Pristoderus flexuosus* sensu Germain (FMNH); 2) *Pristoderus regularis*, holotype (FMNH); 3) *Pristoderus collaris*, holotype (FMNH); 4) *Notocoxelus angustatus* sensu Heinze (Snow Entomological Museum Collection). Scale bars = 1 mm.
The only other use of these names during this period seems to be by Blackwelder (1945), who listed *E. flexuosus* in both *Phloeopsidius* (in the tenebrionids) and *Sparactus* (in the colydiids), but *E. angustatus* only under *Phloeopsidius* (in the tenebrionids). There is no indication that Blackwelder (1945) realized these were parallel uses. More recently, Elgueta and Arriagada (1989) listed the two species in *Sparactus* and *Endophloeus*, respectively, following Germain (1892), having missed both Germain’s (1911) use of *Pristoderus* and Gebien’s use of *Phloeopsidius*.

Where does this leave us? At this point, there are four Chilean species of *Phloeopsidius* (Tenebrionidae), one of which is also a *Pristoderus* (Colydiinae) and another of which is also placed in *Endophloeus* (Colydiinae).

We have not yet been able to locate the Solier types, which should be in the Muséum national d’Histoire naturelle (Paris, MNHN). They are not listed in the extensive notes on colydiine types studied there by S. Adam Śliźniński (in litt.). Although published as colydiids, we now know the type specimens may have been moved to the tenebrionid collections. Curator Antoine Mantilleri of the MNHN tried to find the types in both the colydiid and tenebrionid holdings, but was unsuccessful. NPL subsequently repeated the search of the Solier material in the Gay material (MNHN) as well as the colydiine types with equal results. So, we are left with just the published literature and subsequently identified material.

The original description and illustration of *E. flexuosus* made it clear this was a heteromeros beetle (Lacordaire 1854), and Gebien (1925) agreed. Germain (1892) found specimens that matched the illustrations and description and disagreed, saying clearly both Solier species were tetrameros. Most discussion subsequent to Solier (1851) has centered on *E. flexuosus*, while *E. angustatus* has not been discussed since Germain (1892). The last usage is that of Elgueta and Arriagada (1989), so in the last-one-out-of nomenclature, *E. flexuosus* is currently a colydiid in the genus *Pristoderus* [they listed *E. flexuosus* under *Sparactus*, but that genus was synonymized with *Pristoderus* by Śliźniński and Lawrence (1997)]. This constitutes a return to Germain’s 1911 placement, although this change has never been explicitly stated in print. Supporting this view, NPL found two Solier specimens labeled *Bolitophagus flexuosus* Sol. among the Solier Tenebrionidae material in the collection of S. de Marseul housed in the MNHN. These specimens are labeled in Solier’s hand and agree with *P. flexuosus* in the sense we use here. It is unlikely these two specimens are the types, however, as they do not bear the distinctive rectangular “MNHN/coll. Gay and Solier” type labels and are identified with a later combination (*Bolitophagus flexuosus*). Absent the types and lacking any further information, we seem to be required to leave it there, with contemporaneous material identified by Solier and the work of Germain (1892) and his determined specimens (Fig. 1) standing as the best authorities we can follow. Since *E. flexuosus* is the type species of *Phloeopsidius*, this placement requires that *Phloeopsidius* Gebien be considered a junior synonym of *Pristoderus* Hope, new synonymy.

In the same box mentioned above in the MNHN that was searched by NPL, there was a species label for *Bolitophagus angustatus*, with pinholes in the space above. However, no specimens were present in this box, and none could be located.

In the only hint about *E. angustatus* we have found subsequent to Germain (1892), S. Adam Śliźniński found Chilean specimens in the Humboldt University (Berlin) and Deutsches Entomologisches Institut (then in Eberswalde) collections determined by Ernst Heinze labeled “Namunaria angustatus (Solier)” (S. A. Śliźniński, in litt.). In 1981, Śliźniński provided a compared example to MAI (Fig. 4). One of the specimens mentioned above in the MNNC identified by Germain as *E. angustatus* is also identified by Śliźniński in 1986 as “Namunaria angustatus.” These specimens represent a species that is indeed a colydiine, and it matches Solier’s description. Heinze was a careful worker who we greatly respect, and although this species is far from today’s concept of Namunaria, it is similar to that of the early 20th century. Perhaps this is the correct identification. *Endophloeus angustatus sensu* Heinze and sensu Germain is a species of *Notocoxelus* Śliźniński and Lawrence, and so we will treat this name under this concept until evidence otherwise is found.

The Kulzer types are in the Field Museum of Natural History (Chicago), and through the kindness of Crystal Maier and Charles Hart, we have been able to study them. These two species are in fact in Colydiinae and indeed do belong to *Pristoderus* (Figs. 2–3).

Our findings for these four species of Colydiinae are summarized as follows:

**Notocoxelus angustatus** (Solier, 1851), new combination

*Endophloeus angustatus* Solier, 1851: 242–243 [as Tenebrionidae (Blapstinoides)].

*Endophloeus angustatus*: Germain 1892: 252, 1911: 64; Elgueta and Arriagada 1989: 35 [as Colydiidae].

*Bolitophagus angustatus*: Philippi 1887: 734 [as Tenebrionidae].

**ACKNOWLEDGMENTS**

We would like to thank S. Adam Śliński for access to his notes on European type collections and providing information on his examination of Heinze material, as well as reviewing parts of the manuscript dealing with his work. He also provided identified material to all of the authors over the years and encouragement to study this group. Crystal Maier kindly loaned the Kulzer types in a very timely manner and Charles Hart hand carried them to us. Antoine Mantilleri of the Muséum national d’Histoire naturelle, Paris, kindly searched for the Solier types and aided NPL during his visit, as did Thery Deuve. Ian Foley, Charles Hart, Frank Etzler and Matthew Gimmel all reviewed the manuscript and contributed to its improvement. Francisco Urra and Marcelo Guerrero provided photographic support for the figures from the Museo Nacional de Historia Natural, Santiago, Chile. This is a contribution of the Montana Agricultural Experiment Station.

**REFERENCES CITED**


Fabricius, J. C. 1775. *Systema Entomologiae, sistens insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus, Officina Libraria Kortii, Flensburgi et Lipsiae*.


Hope, F. W. 1840. The Coleopterist’s manual, part the third, containing various families, genera, and
species, recorded by Linneus and Fabricius. Also
descriptions of newly discovered and unpublished
Zoological Record, Insecta (Section 11) 62(1925):
1–421.
ICZN (International Commission on Zoological
Zoological Nomenclature, 4th Edition. Inter-
national Trust for Zoological Nomenclature,
London, UK.
(Col.). Entomologischen Arbeiten aus dem Museum
Genera des coléoptères ou exposé méthodique et
critique de tous les genres proposees jusqu’ici dans
cet ordre d’insectes 1: 1–486.
Lord, N. P., and R. A. B. Leschen. 2014. Illustrated
catalogue and type designations of the New Zealand
Zopheridae (Coleoptera: Tenebrionoidea). Zootaxa
Peña, L. E. 1966. Catálogo de los Tenebrionidae
(Coleoptera) de Chile. Entomologische Arbeiten
Philippi, F. 1887. Catálogo de los coleópteros de Chile.
Anales de la Universidad de Chile 71: 619–806.
[1887 Reprint with numeration 1–190.]
Sharp, D. 1893. Zoological Record. 1892. Zoological
Record, Insecta (Section 13) 29(1892): 1–332.
Sharp, D. 1912. Zoological Record. 1911. Zoological
Record, Insecta (Section 12) 48(1911): 1–413.
of Colydiinae (Coleoptera: Zopheridae) of the
341–440.
Solier, A. A. 1849. [Endophloeus flexuosus Sol.].
Coleópteros Lam. 20, fig. 9. In: Atlas de la
Historia Física y Política de Chile, Tomo Segundo
(C. Gay, editor). Imprenta de E. Thunot y Ca.,
Paris, France.
Solier, A. 1851. Orden III. Coleópteros. In: Historia
Física y Política de Chile segun documentos
adquiridos en esta republica durante doce anos
de residencia en ella (C. Gay, editor). 5: 1–285 [Also
appearing as Fauna Chilena. Insectos. Coleopteros.]
(Received 13 July 2015; accepted 14 January 2016.
Publication date 18 March 2016.)