

# The current status of knowledge on Lycidae Laporte, 1836 from Brazil (Insecta: Coleoptera)

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**ABSTRACT:** Lycids are often very aposematic toxic beetles, and are considered models in mimicry systems. They are cosmopolitan, with the highest diversity around tropical regions, however the knowledge of the South American lycids is yet relatively poor. Here I present an overview of the Brazilian lycids including a complete list of species and updated occurrence data.

## INTRODUCTION

The lycids are soft-bodied beetles, often aposematically colored, presenting high levels of toxins, largely known to act as center models in mimetic rings (Marshall and Poulton 1902; Shelford 1902; Guenther 1931; Darlington 1938; Linsley *et al.* 1961; Moore and Brown 1981). The family Lycidae is a member of Elateriformia series, placed in the Elateroidea superfamily, together with other soft-bodied families like Cantharidae, Lampyridae, Phengodidae, Telegeusidae, as well as hard-bodied Elateridae, Eucnemidae, Throscidae and others (Lawrence and Newton 1995; Lawrence *et al.* 1999; Beutel and Leschen 2005). Lycids are externally similar to cantharids and lampyrids, but can be generally distinguished by the head not entirely covered by the pronotum (a character that differentiates them from higher lampyrids) and by having 3 to 4 strong costae on each elytron, usually with reticulate cells (costae are lacking in Cantharidae and at least reticulate cells are lacking in Lampyridae, since most taxa have some costae). Lycids also differ from fireflies and soldier beetles by presenting long trochanters with insertion of femur mostly set off or sometimes slightly oblique (mostly oblique in lampyrids and strongly oblique in cantharids), moreover their midcoxae are distinctly separated, while continuous or almost continuous in Cantharidae and Lampyridae.

Lycids, also known as net-winged beetles, are cosmopolitan and most diverse in tropical regions (Wallace 1867; Kleine 1933; Blackwelder 1945). The taxonomical and distributional knowledge is reasonable in North America and some regions of Central America, well established in Europe and many Asiatic regions, but relatively poor in South America (*e.g.* Leng and Mutchler 1922; Darlington 1938; Green 1949; Bocak and Bocakova 1990, 1999; Bocak 1998; Zaragoza-Caballero 1999; Bocakova 2001, 2003; Kazantsev 2004, 2005).

This family is comprised of about 110 genera and over 4000 described species (Kleine 1933; Blackwelder 1945; Bocakova 2001, 2003; Bocak and Bocakova 2008). According to former works, some authors indicated the presence of 40 genera and 800 species in the Neotropical region, and about 150 species distributed in 22 genera in

Brazil (Kleine 1933; Blackwelder 1945; Costa *et al.* 1988; Costa 2000).

Although the majority of Brazilian lycid species was described by foreign taxonomists up to 1949 (Table 1), there is a recent interest emerging in national researchers to study little known elateroids in the country. Former researchers usually received specimens from Brazil and other South American countries and often the collection site was not precise, or even non-existent, labeled only as “Brazil”, “Brasilia” or “South America”. Brazilian lycid fauna has never been subject of direct survey, there are precious, but little accessible information about geographic distribution of species and even genera, available only in some descriptive works or short communications (*e.g.* Bourgeois 1886, 1905).

Therefore, the data on lycids from Brazil were accessed strictly from species described before the first half of 20<sup>th</sup> century. Bocakova (2001, 2003) redescribed some Brazilian species, however, after Pic (1949) no single lycid species was described from Brazil until the work of Nascimento and Bocakova (2009). Herein I present updated data on the Brazilian lycids, especially new records for the country.

## MATERIALS AND METHODS

The data on Brazilian lycids was obtained from literature (Kleine 1933, 1942, Blackwelder 1945, Nascimento and Bocakova 2009, 2010a, b) and based on field work, mainly from Atlantic Forest remnants in São Paulo State and examination of the material held in the collections of Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZSP); Coleção Entomológica Pe. Jesus Santiago Moure – Departamento de Zoologia da Universidade Federal do Paraná, Curitiba, Brazil (DZUP); Muséum National d’Histoire Naturelle, Paris, France (MNHN); British Museum of Natural History, London, United Kingdom (BMNH) and from Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Brazil.

## RESULTS AND DISCUSSION

Bocak and Bocakova (1990) established the first higher classification of Lycidae family, thereafter some

changes were made and are summarized in Bocak and Bocakova (2008), that established a new classification, considering morphological and molecular data, wherein six subfamilies were recognized, being one of the main changes in Calochrominae Lacordaire, 1857 and Erotinae Leconte, 1881, both lowered to the tribal status within Lycinae Laporte, 1836. Even considering some changes proposed by R.S. Miller (unpublished data) and Kazantsev and Zaitsev (2008), all lycid taxa known to occur in Brazil belong to Lycinae, the largest of the subfamilies,

representing 93% of all the described species of the world (Bocak and Bocakova 2008).

Among the tribes that occur in Brazil, Calopterini Green, 1949 is the richest, with 14 genera, followed by Eurrhacini Bocakova, 2006 and Platerodini Kleine, 1928 with 5 genera; and Leptolycini Leng and Mutchler, 1922, with three genera; and Calochromini Lacordaire, 1857 and Lycini Laporte, 1836 with a single genus (Pic 1929; Kleine 1933; Blackwelder 1945; Nascimento and Bocakova 2009, 2012; E.A. Nascimento unpublished data) (see Table 1).

**TABLE 1.** List of genera and species present in Brazil. \*\*: undescribed or unidentified species; (?): doubtful record.

TAXON	NUMBER OF BRAZILIAN SPECIES
<b>Subfamily LYCINAE Laporte, 1836</b>	
<b>Tribe Calochromini Lacordaire, 1857</b>	
<i>Macrolygistopterus</i> Pic, 1929	7
<i>bilineatus</i> (Pic, 1923)	
<i>elegans</i> Bourgeois, 1880	
<i>germaini</i> Pic, 1930	
<i>gounellei</i> Bourgeois, 1886	
<i>goyasensis</i> Pic, 1923	
<i>quadricostatus</i> (Buquet, 1842)	
<i>testaceirostris</i> Pic, 1930	
<b>Tribe Calopterini Green, 1949</b>	
<b>Subtribe Acroleptina Bocakova, 2005</b>	
<i>Acroleptus</i> Bourgeois, 1886	1
<i>chevrolati</i> Bourgeois, 1886	
<i>Brasilycus</i> Nascimento and Bocakova, 2010	2
<i>capixabus</i> Nascimento and Bocakova, 2010	
<i>rondonensis</i> Nascimento and Bocakova, 2010	
<i>Ceratopriomorphus</i> Pic, 1922	1
<i>humeralis</i> Pic, 1922	
<i>Cyrtopteron</i> Bourgeois, 1905	2
<i>atricorne</i> Pic, 1922	
<i>reverens</i> Kleine, 1942	
<i>Falsocaenia</i> Pic, 1922	3
<i>decipiens</i> (Gorham, 1884)	
<i>incognitus</i> Kleine, 1942	
<i>paranana</i> (Pic, 1922)	
<i>Lycinella</i> Gorham, 1884	..**
<i>Lycomorphon</i> Pic, 1922	2
<i>amazonicum</i> Nascimento and Bocakova, 2009	
<i>brasiliense</i> Nascimento and Bocakova, 2009	
<i>Mesopteron</i> Bourgeois, 1905	11
<i>amparosum</i> Pic, 1938	
<i>angulicolle</i> (Lucas, 1857)	
<i>filiforme</i> (Lucas, 1857)	
<i>flavocostatum</i> (Taschenberg, 1874)	
<i>fossulatum</i> (Lucas, 1857)	
<i>gounellei</i> Pic, 1931	
<i>notaticolle</i> Pic, 1922	
<i>orosicum</i> Pic, 1933	
<i>pauli</i> Pic, 1931	
<i>subnitidum</i> Pic, 1931	
<i>subopacum</i> Pic, 1931	
<b>Subtribe Calopterina Green, 1949</b>	
<i>Caenia</i> Newmann, 1838	1
<i>diversipennis</i> Pic, 1923	
<i>Calopteron</i> Castelnau, 1838	39
<i>affine</i> Lucas, 1857	
<i>angustalisi</i> Pic, 1933	
<i>anxium</i> Bourgeois, 1879	
<i>apicale</i> (Guérin-Méneville, 1838)	

TABLE 1. CONTINUED.

TAXON	NUMBER OF BRAZILIAN SPECIES
<i>auritum</i> Bourgeois, 1886	
<i>bahiense</i> Pic, 1923	
<i>basimarginatum</i> Pic, 1938	
<i>brasiliense</i> Castelnau, 1840	
<i>confrater</i> Taschenberg, 1874	
<i>discoideale</i> Taschenberg, 1874	
<i>elongatulum</i> Taschenberg, 1874	
<i>espiritense</i> Pic, 1928	
<i>fundatum</i> Kleine, 1942	
<i>gounellei</i> Bourgeois, 1886	
<i>goyasense</i> Pic, 1922	
<i>gracile</i> Guérin-Méneville, 1855	
<i>grandjeani</i> Pic, 1933	
<i>jatahyense</i> Pic, 1923	
<i>juvenile</i> Bourgeois, 1879	
<i>kirschi</i> Taschenberg, 1874	
<i>laticolle</i> Bourgeois, 1879	
<i>maculatum</i> Taschenberg, 1874	
<i>melanoxanthum</i> Kirsch, 1870	
<i>nigripes</i> Taschenberg, 1874	
<i>palpale</i> Kirsch, 1865	
<i>picipenne</i> Perty, 1830	
<i>praeustum</i> Taschenberg, 1874	
<i>regulare</i> Taschenberg, 1874	
<i>scalare</i> Taschenberg, 1874	
<i>schneideri</i> Pic, 1933	
<i>serratum</i> (Linnaeus, 1758)	
<i>sexmaculatum</i> Pic, 1938	
<i>sexvittatum</i> Taschenberg, 1874	
<i>speciosum</i> Guérin-Méneville, 1855	
<i>terminatum</i> (Latreille, 1833)	
<i>tricolor</i> (Olivier, 1790) (?)	
<i>tropicum</i> (Linnaeus, 1764)	
<i>variegatum</i> Kirsch, 1865	
<i>volxemi</i> Bourgeois, 1879	
<i>Cartagonum</i> Pic, 1922	1
<i>apiuba</i> Nascimento and Bocakova, 2009	
<i>Idiopteron</i> Bourgeois, 1905	14
<i>bicoloricolle</i> Pic, 1922	
<i>binotaticolle</i> Pic, 1922	
<i>binotatum</i> (Guérin-Méneville, 1855)	
<i>bivittatum</i> (Taschenberg, 1874)	
<i>elongatipenne</i> Pic, 1933	
<i>latetestaceum</i> Pic, 1922	
<i>mendense</i> Pic, 1922	
<i>obconicicolle</i> Pic, 1922	
<i>pauli</i> Pic, 1922	
<i>prescutellare</i> Pic, 1922	
<i>rufulum</i> (Gorham, 1880)	
<i>staudingeri</i> Pic, 1933	
<i>tertium</i> (Pic, 1933)	
<i>testaceicostatum</i> Pic, 1922	
<i>Leptoceletes</i> Green, 1952	1
<i>burchelli</i> (Bourgeois, 1904)	
<i>Metapteron</i> Bourgeois, 1905	9
<i>angustatum</i> Pic, 1922	
<i>apicale</i> Pic, 1922	
<i>geniculatum</i> Pic, 1922	
<i>hirsutum</i> Pic, 1936	
<i>limbatum</i> (Fabricius, 1801)	
<i>reductum</i> Pic, 1922	

TABLE 1. CONTINUED.

TAXON	NUMBER OF BRAZILIAN SPECIES
<i>signaticolle</i> Pic, 1922	
<i>suturale</i> (Latreille, 1833)	
<i>xanthomelas</i> (Lucas, 1857)	
<b>Tribe Eurrhacini Bocakova, 2005</b>	
<i>Calocladon</i> Gorham, 1881	..**
<i>Emplectus</i> Erichson, 1847	10
<i>abundans</i> (Taschenberg, 1874)	
<i>apicalis</i> Pic, 1923	
<i>foveolatus</i> (Pic, 1922)	
<i>hickeri</i> Pic, 1928	
<i>minarum</i> Bourgeois, 1886	
<i>multipunctatus</i> (Pic, 1922)	
<i>piceus</i> Pic, 1923	
<i>scalaripennis</i> Bourgeois, 1886	
<i>stipatus</i> Bourgeois, 1886	
<i>subtilis</i> Kleine, 1943	
<i>Eurrhacus</i> Waterhouse, 1879	..**
<i>Linoptes</i> Gorham, 1884	2
<i>amazonicus</i> Pic, 1923	
<i>atripennis</i> Pic, 1932	
<i>Lycoplateros</i> Pic, 1922	..**
<i>Haplobothris</i> Bourgeois, 1879	17
<i>apicicornis</i> Pic, 1931 (?)	
<i>baeri</i> Pic, 1930	
<i>basipennis</i> Pic, 1938	
<i>elongata</i> Pic, 1922	
<i>gounellei</i> Pic, 1922	
<i>hahneli</i> Pic, 1938	
<i>humeralis</i> Bourgeois, 1879	
<i>infasciata</i> Pic, 1938	
<i>mediofasciata</i> Pic, 1938	
<i>melzeri</i> Pic, 1935	
<i>nigroapicalis</i> Pic, 1935	
<i>nigronotata</i> Pic, 1912	
<i>pumila</i> Bourgeois, 1879	
<i>robusta</i> Pic, 1922	
<i>scapularis</i> Bourgeois, 1879	
<i>setosella</i> Bourgeois, 1886	
<i>testacea</i> Pic, 1930	
<b>Tribe Leptolycini Leng and Mutchler, 1922</b>	
<i>Pseudacroleptus</i> Pic, 1911	1
<i>obscuricolor</i> Pic, 1911	
<i>Flabellocaenia</i> Pic, 1929	1
<i>bourgeoisi</i> Pic, 1931	
<i>Neolyrium</i> Kazantsev, 2005	..**
<b>Tribe Lycini Laporte, 1836</b>	
<i>Lycus</i> Fabricius, 1787	1
<i>icarus</i> Bourgeois, 1889	
<b>Tribe Platerodini Kleine, 1929</b>	
<i>Cavoplateros</i> Pic, 1913	1
<i>spinipes</i> Pic, 1913	
<i>Falsocalleros</i> Pic, 1933	..**
<i>Picomicrolycus</i> Özdikmen, 2009	1
<i>irenae</i> Nascimento and Bocakova, 2012	
<i>Plateros</i> Bourgeois, 1879	32
<i>angustior</i> Pic, 1925	
<i>apicalis</i> (Germar, 1824)	
<i>armitagei</i> (Pic, 1934)	
<i>bang-haasi</i> (Pic, 1931)	
<i>basalis</i> (Pic, 1939)	
<i>batesi</i> (Pic, 1922)	

TABLE 1. CONTINUED.

TAXON	NUMBER OF BRAZILIAN SPECIES
<i>blumenaus</i> (Pic, 1931)	
<i>brasiliensis</i> (Lucas, 1857)	
<i>brunneolineatus</i> (Pic, 1934)	
<i>curtebilineatus</i> (Pic, 1934)	
<i>discolineatus</i> (Pic 1931)	
<i>donckieri</i> (Pic, 1934)	
<i>edmondi</i> Pic, 1923	
<i>egaensis</i> (Pic, 1922)	
<i>elongatior</i> Pic, 1922	
<i>fortecostatus</i> Pic, 1949	
<i>fuliginosus</i> (Pic, 1934)	
<i>goyasensis</i> Pic, 1925	
<i>grandjeani</i> (Pic, 1931)	
<i>inhumeralis</i> (Pic, 1938)	
<i>longelineatus</i> (Pic, 1934)	
<i>mediofasciatus</i> (Pic, 1933)	
<i>parananus</i> Pic, 1923	
<i>particularis</i> (Pic, 1923)	
<i>pauli</i> Pic, 1923	
<i>pectinicornis</i> Pic, 1923	
<i>plaumanni</i> (Nascimento and Bocakova, 2012)	
<i>reductelineatus</i> Pic, 1923	
<i>reitteri</i> Pic, 1922	
<i>robusticollis</i> (Pic, 1934)	
<i>subaequalis</i> Bourgeois, 1886	
<i>variicostatus</i> Bourgeois, 1904	
<i>Teroplas</i> Gorham, 1884	..**

Considering the genera placed as *incertae sedis* by Bocakova (2003) as non-calopterini (see also Kazantsev and Zaitsev 2008), all Calopterini are known to occur in Brazil, including *Lycinella* Gorham, 1884, recently reported from São Paulo State (E.A. Nascimento, unpublished data). The tribe Platerodini has a wide geographical distribution (Bocak and Bocakova 1990, 2008), but some genera were considered to be exclusive to Central and North America (Bocakova 2001; Kazantsev 2005). It should be stressed here that some of these genera in fact occur in Brazil, namely *Falsocalleros* Pic, 1933, *Picomicrolycus* (Pic, 1922) and *Teroplas* Gorham, 1884 with undescribed and recently described species from São Paulo State (Nascimento and Del-Claro 2010, Nascimento and Bocakova 2012a). Recently Nascimento and Bocakova (2012b) synonymized *Sculptocalleros* Pic, 1949 with *Plateros*.

In Calochromini, Kleine (1933) and Blackwelder (1945) overlooked the act made by Pic (1929) when created the genus *Macrolygister* Pic, 1929, transferring all American species of *Lygister* Mulsant, 1838 to *Macrolygister*. In this way, only *Macrolygister* occurs in Brazil. Considering *Pseudacroleptus* Pic, 1911 and *Flabellocaenia* Pic, 1929 as members of Leptolycini, as proposed by R.S. Miller (unpublished data) and Kazantsev and Zaitsev (2008), and the recently found *Neolyrium* Kazantsev, 2005 from Paraná and São Paulo States (E.A. Nascimento, unpublished data), Leptolycini also occurs in Brazil. Tribe Lycini is represented by a single species of *Lycus* Fabricius, 1887.

According to Kleine (1933) and Blackwelder (1945), Erotini is represented by a Brazilian species of *Eros*

Newman, 1838, but this occurrence is controverser, since according to Bocak and Bocakova 2008, this genus occurs in the Palaearctic, Nearctic and Oriental regions, and probably many species are misplaced in this genus (see Kazantsev 2004). Furthermore, considering the original description data, referring *Eros melanopterus* Lucas 1857 as collected in the Sarayacu mission, and according to discussions with colleagues (U.R. Martins and R. Constantin, personal communication) besides bibliographic data (Herndon 1854), I consider that this species do not occur in Brazil, but in Peru, more precisely in Ucayali region (R. Constantin, personal communication).

In Eurrhacini, *Eurrhacus* Waterhouse, 1879; *Calocladon* Gorham, 1881 and *Lycoplateros* Pic, 1922 were yet not registered from Brazil. Some *Eurrhacus* specimens from Paraná, Espírito Santo, São Paulo, Goiás and Roraima States were analyzed. *Lycoplateros* specimens were collected by the author in São Paulo State and it is now also known from Paraná, Espírito Santo, Mato Grosso, Rondônia, Pará, Roraima and Amazonas States, showing a distribution from Southern to Northern Brazil. *Calocladon* is known from Acre, Amazonas, Roraima, Mato Grosso and Paraná States; moreover it was recently collected by the author in São Paulo State (Southeastern Brazil). Therefore, these registers are important, since it shows a considerably occurrence extension of these previously unknown genera in Brazil, including many undescribed species.

Some new Calopterini were recently described and registered for the first time from Brazil, namely *Lycomorphon* Pic, 1922 (Northern and Southeastern regions) and *Cartagonum* Pic, 1922 (Southeastern region), increasing the

knowledge on the geographical distribution of these taxa in the Neotropical region (Nascimento and Bocakova 2009, 2010a). Although not reported in Bocakova *et al.* (2012), a recent analysis of the collection from CECG showed that *Falsocaenia paranana* (Pic, 1922) also occur in Brazil, in Southeastern region. The genus *Brasilycus* Nascimento and Bocakova, 2010 and two new species from Brazil were described from Northern and Southeastern regions (Nascimento and Bocakova, 2010b). Since the females are poorly known, and sometimes descriptions are completely lacking, and due to the importance of these characters in the cladistic analyses (*e.g.* Bocakova 2005), I therefore stress its importance for future works dealing with lycid taxonomy and systematics.

The present data comprises a total of 31 genera and 160 described species of Lycidae occurring in Brazil (Kleine 1933; Blackwelder 1945; Pic 1929; Nascimento and Bocakova 2009, 2010a, 2010b, 2012a, 2012b, E.A. Nascimento, unpublished data). The huge gap in Brazilian lycids studies is just starting to be covered, some genera are being revised and new ones described, but there is still a lot of work ahead in Brazil, from taxonomy to ecology.

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# The current status of knowledge on Lycidae Laporte, 1836 from Brazil (Insecta: Coleoptera)

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## ERRATUM

**PAGE 324, within TABLE 1:**

*Macrolygistopterus elegans* Bourgeois, 1880, *M. gounellei* Bourgeois, 1886 and *M. goyasensis* Pic, 1923, **should be** *Macrolygistopterus elegans* (Bourgeois, 1880), *M. gounellei* (Bourgeois, 1886) and *M. goyasensis* (Pic, 1923).

We regret this error.

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