

***Ivierhipidius*, an enigmatic new Neotropical genus  
of Ripiphoridae (Coleoptera: Tenebrionoidea)  
with four new species**

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**Abstract.** *Ivierhipidius*, gen. nov., with four new species, *Ivierhipidius paradoxus* sp. nov. (Belize, Honduras), *Ivierhipidius monneorum* sp. nov. (Brazil), *Ivierhipidius youngi* sp. nov. (Ecuador) and *Ivierhipidius cechorum* sp. nov. (Argentina), are described and figured. The new Neotropical genus shares strong similarities with the Asian *Pterydrias* Reitter, 1895 (= *Eorhipidius* Iablokoff-Khnzorian, 1986) (currently placed in Ripidiinae: Eorhipidiini), but most similarities consist of lack of modifications, and may be plesiomorphic. It is placed in Ripiphoridae incertae sedis, awaiting a review of higher taxonomic relationships within Ripiphoridae. *Ivierhipidius* is known only from winged males; the female, which is assumed to be flightless, immature stages and life history are unknown.

**Key words.** Coleoptera, Tenebrionoidea, Ripiphoridae, new genus, new species, morphology, Belize, Honduras, Ecuador, Brazil, Argentina, Neotropical Region

### Introduction

The purpose of this contribution is to provide names and familial placement for members of an enigmatic and poorly understood taxon of Neotropical beetles here assigned to Tenebrionoidea: Ripiphoridae. These beetles are known only from male specimens, sporadically collected by flight interception devices (Malaise traps and flight intercept traps) or without collecting information being recorded, in a wide range of Neotropical forest environments from Belize and Honduras south to northern Argentina and southern Brazil. A description and placement will make the group available for further work, and facilitate much needed phylogenetic analysis of the subfamilies, tribes and genera of Ripiphoridae, as well as additional study of their distribution. Future work may shed light on the unknown female and immature stages (the latter are assumed to be parasitic). Adult males of the new genus are amongst the least modified of all Ripiphoridae, which intuitively suggests a link with Ripidiinae: Eorhipidiini, though this should be viewed with caution.

## Materials and methods

Label data is repeated verbatim, with any explanatory notes in square brackets [ ]. Lines of text are separated by '/' and separate labels by '//'. Printed or handwritten labels or parts of labels are distinguished by the notations [pr.] and [hw.], respectively. All whole beetle measurements are based on combined length of head, pronotum and elytra, measured individually. Measurements were taken under a microscope using a hand held 5mm measuring device. Metathoracic (flight) wings were dissected from beetles rehydrated in warm water, suspended in water, and mounted on a mounting-card using a very dilute solution of water soluble glue. Wing venation terminology follows KUKALOVÁ-PECK & LAWRENCE (1993).

Material examined is deposited in the following museums and private collections:

BMNH	Natural History Museum (formerly British Museum, Natural History), London, United Kingdom;
CNC	Canadian National Collection of Insects, Ottawa, Canada;
IMLT	Fundación e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Tucumán, Argentina;
MAIC	Michael A. Ivie Private Collection, Bozeman, Montana, USA;
MNRJ	Museu Nacional Rio de Janeiro, Rio de Janeiro, Brazil;
NMPC	National Museum, Prague, Czech Republic;
RHTC	Robert H. Turnbow, Jr., Private Collection, Fort Rucker, Alabama, USA;
SKTC	Stanislav Krejčík Private Collection, Tvrdkov, Czech Republic.

## Taxonomy

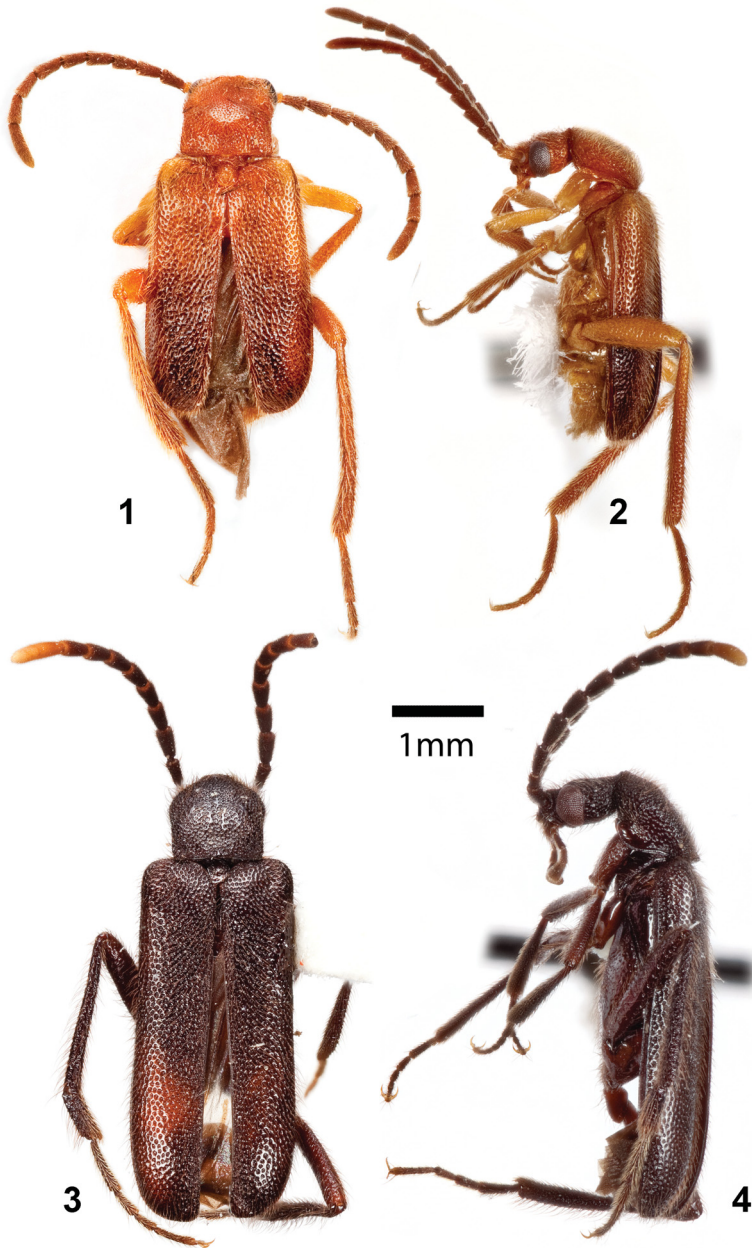
### *Ivierhipidius* gen. nov.

(Figs 1–15)

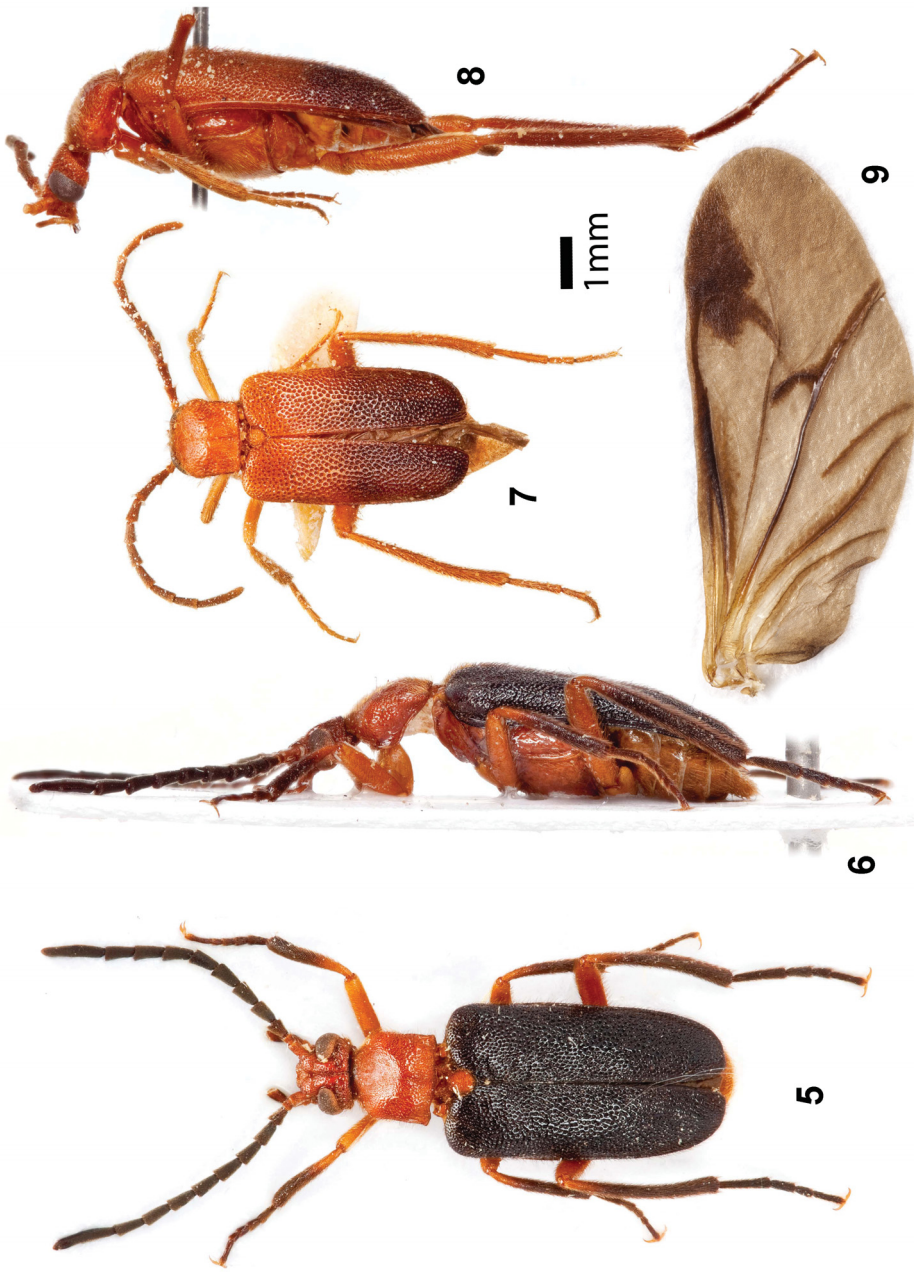
**Family placement.** Ripiphoridae *incertae sedis*.

**Type species.** *Ivierhipidius paradoxus* sp. nov., by present designation.

**Description.** Only known from males: 3.2–10.2 mm (combined length of head, pronotum and elytra measured individually). Dorsal colour varying from rich orange brown to black, in some species bicolored with elytra contrasting with head and pronotum. Head prognathous. Mandibles elongate, strongly recurved, laterally flattened, untoothed. Maxillary palpi tetramerous, with enlarged palpifer that can resemble an additional palpomere. Apical palpomere enlarged, almost securiform, with distal sensory excavation, and with distinct smooth impunctate impression on dorsal surface. Labrum fused to frontoclypeus to form a distinct process. Labial palps apparently absent. Antennae filiform, with 11 antennomeres, 11<sup>th</sup> antennomere elongated, 1.8–2.3× length of 10<sup>th</sup>. Head broadest across eyes. Eyes large but not contiguous. Front and back of head unite to form a strong transverse carina at vertex, which closes the gap with raised anterior margin of pronotum when head raised. Pronotum wider than head at widest point (at base of apical third), more or less bell-shaped, basal two-thirds of pronotum parallel-sided. Pubescence of pronotum long, semirecumbent, directed towards pronotal disk. Margins of pronotum sinuate at both sides and base either side of hind angle, basal margin more-or-less straight in middle. Scutellum distinct. Elytra with marked shoulders, broader than pronotum, parallel-sided, elytral length shoulder–apex 1.7–2.4× as long as maximum width, rounded at apices, punctured and pubescent, weakly shining. Hind wing (Fig. 9) with



Figs 1–4. Habitus. 1–2 – *Ivierhipidius paradoxus* sp. nov.: 1 – holotype, dorsal view; 2 – paratype, lateral view. 3–4 – *I. youngi* sp. nov.: 3 – holotype, dorsal view; 4 – holotype, lateral view. Images by Harry Taylor (Natural History Museum London).



Figures 5-9. Habitus. 5-6 – *Ivierhipidius cechorum* sp. nov.: 5 – holotype, dorsal view; 6 – holotype, lateral view. 7-8 – *I. monneorum* sp. nov.: 7 – holotype, dorsal view; 8 – paratype, lateral view. 9 – *Ivierhipidius paradoxus* sp. nov., paratype, mounted metathoracic wing. Images by Harry Taylor (Natural History Museum London).

reduced venation, R3 incomplete, reaching RP only as a weakly indicated line RC absent, R4 not indicated. Apical field with dark area beyond R-R3 junction; apical dark area of characteristic shape with three projections, the much longer middle one extending either side of R1 almost as far as RP (see KUKALOVÁ-PECK & LAWRENCE 1993) (note that Fig. 9 has a diagonal fold running across the wing that should not be mistaken for a vein). Abdomen with 5 visible ventrites, in most species with a dense brush of conspicuous dark setae covering the base of the second ventrite, overlapped by the translucent apical margin of the first ventrite. Metatrochanter distinct, deeply indented at apex, so heart-shaped (Figs 10, 11). Legs long, slender, unmodified. Tibiae long, metatibia around 1.5× length of corresponding femur or tarsus. Two tibial spurs, often small, present on all tibiae. Tarsi long, unlobed and unmodified. Tarsal claws simple. Tarsal formula 5-5-4.

**Diagnosis.** Distinguished from all other genera of Ripiphoridae by the following combination of characters: Antennae simple, symmetrical and unmodified. Elytra complete, simple, unmodified. Legs unmodified, all tibiae with two tibial spurs, tarsi with simple claws. Metatrochanter of characteristic shape, deeply indented at apex, heart-shaped (Figs 10–11). The shape of the metatrochanter is apparently apomorphic for this taxon.

**Etymology.** The name is derived from the suffix *-rhipidius*, taken from the name of the similar *Eorhipidius* Iablokoff-Khnzorian, 1986 (now a synonym of *Pterydrias* Reitter, 1895), and the name Ivie in honour of Michael and Ladonna Ivie of Bozeman, Montana, for their kind hospitality and expert and persistent encouragement. The genus name is masculine.

### *Ivierhipidius paradoxus* sp. nov.

(Figs 1–2, 9–10, 12)

**Type locality.** Central America, Belize, Cayo District, Chiquibul Forest Reserve, Las Cuevas field station.

**Type material.** HOLOTYPE: ♂, 'BELIZE, June 2006 / Chiquibul Forest Res. / Las Cuevas field station / 88°59'W; 16°44'N / James Kitson leg. // BMNH{E} / 2006-141 / Kitson & Gillett // Malaise Trap' (BMNH). PARATYPES: 1 ♂, same data as holotype (NMPC); 4 ♂♂, 'BELIZE, May 2010 / Chiquibul Forest Res. / Las Cuevas field station / 88°59'W; 16°44'N / Malaise Trap // Barclay, Mendel, Quicke & Broad leg.' (BMNH); 1 ♂, 'BELIZE, Chiquibul Forest Res. / Las Cuevas field station / 88°59'W; 16°44'N // FIT [Flight Intercept Trap] 11 / 5.8.94.' (MAIC); 1 ♂ same data except 'MT [Malaise trap] 12 / 16.9.94.' (BMNH); 1 ♂, same data except 'MT 11L / 24.9.94.' (BMNH); 1 ♂, same data except 'MT 12 / 14-17.v.96 / Wk80' (BMNH). 1 ♂, 'HONDURAS: Ocotepeque / R. B. [Reserva Biologica] Guisayote / 23 May 1995 / R. Turnbow' (RHTC).

**Diagnosis. Male.** Length (holotype) 4.5 mm (combined length of head, pronotum and elytra measured individually), greatest width 1.5 mm across elytral shoulders. Entire beetle foxy orange-brown except antennomeres 2–11 darkened, and elytra gradually infuscated, becoming black at tip, elytral darkening may extend to whole apical half of elytra in some specimens. Carina of vertex emarginate in centre, giving a bilobed appearance when viewed frontally or posteriorly. Head, thorax and elytra coarsely and evenly punctured, puncturation becoming more wrinkled and confluent towards apices of elytra, and covered in long semirecumbent yellowish pubescence. Legs long, covered in long yellowish pubescence. Base of second ventrite, where it is overlapped by the translucent apical margin of the first ventrite, covered by dense brush of setae.

**Differential diagnosis.** See the key below.

**Collection circumstances.** All individuals with known collecting circumstances were collected in unbaited flight interception devices, Malaise traps and flight intercept traps (the former collecting insects that fly upwards when encountering a vertical obstacle, the latter insect that drop down). The traps were placed in tropical rainforest probably at ground level. Extensive light trapping in the Belize locality at the same time did not collect any individuals, suggesting that the flying males are not attracted to light. Specimens have been collected in May, June, August and September.

**Etymology.** The specific name, the Latin adjective *paradoxus* (-a, -um), refers to the paradoxical nature of these beetles, in that only males are known, no life history is known, and they have remained undescribed for a long period of time. It is also a homage to the first-described member of Ripiphoridae, the Palaearctic *Metoecus paradoxus* (Linnaeus, 1761).

**Distribution.** Most specimens of *Ivierhipidius paradoxus* sp. nov. are from the Chiquibul Forest of southern Belize, close to the Guatemalan border. One paratype is from Ocotepaque in western Honduras. The species probably also occurs in adjoining countries. It is the only member of the genus so far known from north of the Isthmus of Panama.

***Ivierhipidius youngi* sp. nov.**

(Figs 3–4, 13)

**Type locality.** South America, Ecuador, Napo Province, Baeza, 2000 m a.s.l.

**Type material.** HOLOTYPE: ♂, 'ECUADOR: Napo / Baeza, 2000m [pr] // 5.III.1979 / S. Marshall // CNC [printed purple card]' (CNC).

**Diagnosis. Male** (holotype). Length 5.7 mm (combined length of head, pronotum and elytra measured individually), greatest width 1.5 mm across elytral shoulders. Beetle entirely very dark brown to black, except final (11<sup>th</sup>) antennomere a sharply contrasting yellow. Abdomen missing from the only known specimen. Head, thorax and elytra coarsely and evenly punctured, puncturation of thorax less regular and more confluent than elytra; punctures of base of elytra close, becoming more widely spaced towards apex. Entire beetle covered in long semirecumbent greyish black pubescence. Elytra long, parallel-sided, 2.4× as long as wide. Legs long, covered in long greyish black pubescence.

**Differential diagnosis.** This is one of the most distinctive species of the genus, the only one which is entirely black (except the apical antennomere); compared to other species, the elytra of *I. youngi* sp. nov. are proportionally much longer and narrower. See also the key below.

**Collection circumstances.** This species is known from a single specimen collected in March at 2000 m above sea level. Circumstances of collecting are not known, though the collector is a specialist on Diptera.

**Etymology.** This species is named in honour of Dr. Daniel K. Young of Wisconsin, specialist of Pyrochroidae, who kindly made material of this new taxon that he had accumulated over many years, including this specimen, available to me for study. The name is a noun in the genitive singular.

**Distribution.** The only known specimen of *Ivierhipidius youngi* sp. nov. is from moderately high altitude (2000 metres above sea level) at Baeza, in the Canton of Quijos, Napo Province, Ecuador.



10



11



12



13



14



15

Figs 10–15. 10–11 – detail of heart-shaped, deeply indented metatrochanter (10 – *I. paradoxus* sp. nov., paratype; 11 – *I. monneorum* sp. nov., holotype). 12–15 – detail of head, frontal view: (12 – *I. paradoxus* sp. nov., paratype; 13 – *I. youngi* sp. nov., holotype; 14 – *I. cechorum* sp. nov., paratype; 15 – *I. monneorum* sp. nov., paratype). Scale bars = 1 mm. Images by Harry Taylor (Natural History Museum, London).

***Ivierhipidius cechorum* sp. nov.**

(Figs 5-6, 14)

**Type locality.** South America, Northern Argentina, Salta Province, Chicoana River, West of El Carril.**Type material.** HOLOTYPE: ♂, 'Argentina N / Salta Prov. Chicoana riv. / W of el Carril / 28.1.2009 Snížek Igt [pr.]' (BMNH). PARATYPES: 1 ♂, same data as holotype (SKTC); 1 ♂, 'ARGENTINA / TUCUMAN / Trancas-Tacanas / 1-30.XI.1968 / Col. L. Stange [pr.] // COLECCIÓN / Fundacion M. Lillo / 4000 S.M. Tucumán / TUCUMAN-ARGENTINA // IMLT [PINK LABEL] [pr.]' (IMLT).**Diagnosis. Male** (holotype). Length 9.37 mm (combined length of head, pronotum and elytra measured individually), greatest width 3.21 mm across elytral shoulders. Beetle bright orange red, except elytra completely black, apical three quarters of all tibiae and all tarsi infuscated to black, antennae from antennomere 3 black, and last maxillary palpomeres infuscated. Paratype from Tucuman is apparently slightly teneral and has humeri of elytra brownish orange.**Differential diagnosis.** Differs from all other known species in head, pronotum and scutellum strongly contrasting in colour with elytra. Whole body including scutellum clothed with close, erect pubescence concolorous with derm. Pubescence on legs dense and thicker than in other species. See also the key below.**Collection circumstances.** No collecting circumstances are recorded for any of the three known specimens, though apparently M. Snížek, collector of two of them, never uses flight interception devices. Specimens were collected in November and January.**Etymology.** The specific name honours the many expert entomologists of the Czech Republic, which has been described as a 'superpower' of world entomology. Czech entomologists have made an exceptional contribution to the world's knowledge of Coleoptera and other insects, including by collecting this interesting species. The name is a noun in the genitive plural.**Distribution.** This species is known from three specimens from the adjoining Salta and Tucuman provinces of northern Argentina. This species has, narrowly, the most southerly distribution of any member of the genus.***Ivierhipidius monneorum* sp. nov.**

(Figs 7-8, 11, 15)

**Type locality.** South America, Brazil, Rio de Janeiro, Tijuca Forest, Corcovado.**Type material.** HOLOTYPE: 1 ♂, 'BRASIL Rio de Janeiro / D.F. CORCOVADO / xii.1957 [hw] / Alvarenga e Seabra [pr. Black border]' (MNRJ). PARATYPES: 2 ♂♂, 'BRASIL Rio de Janeiro / D.F. CORCOVADO / x. 1958 [hw] / Alvarenga e Seabra [pr. black border]' (MNRJ, BMNH); 1 ♂, 'BRASIL Rio de Janeiro / D.F. CORCOVADO / 11 Setembro 1959 [hw] / Alvarenga e Seabra [pr. black border] // COLECAO / CAMPOS SEABRA [pr. black border] // Moyo 40 [hw, modern]' (BMNH); 1 ♂, 'CORCOVADO / RIO de JANEIRO / BRASIL // 23.x.1974 / M.A. Monné // Moyo 44 [hw, modern]' (MNRJ).**Diagnosis. Male.** Length 7.4–10.2 mm (combined length of head, pronotum and elytra measured individually), greatest width 2.5–3.9 mm across elytral shoulders. Beetle colouration resembling *I. paradoxus*, foxy orange brown, except antennomeres 9–11 infuscated and elytra darkening after midpoint to almost black at apex.**Differential diagnosis.** This species differs from the similarly coloured *I. paradoxus* in the shape of the head (Fig. 15), the puncturation of elytra much deeper and more conspicuous, with derm of elytra strongly shining between punctures, pubescence of elytra sparser, legs



longer in proportion to body and body size considerably larger. In size, shape and proportion of head, thorax and elytra (as well as in distribution) this species more closely resembles *I. cechorum*, from which it differs in elytral colour (see the key below).

**Collection circumstances.** The five known specimens were all collected at Corcovado, the famous site of the Christ Redeemer statue, situated on a 710 m granite peak in the Tijuca Forest National Park above Rio de Janeiro, southern Brazil. The statue is illuminated, and apparently (M. A. Ivie, pers. comm.) entomologists climb up to it in the mornings to collect insects attracted by the lights on the previous night (though this is no indication that the specimens in question were collected at light, rather than, for example, by hand in the forest below). Specimens were collected between 1957 and 1974, in September, October and December.

**Etymology.** The name honours Drs. Marcela L. Monné and Miguel A. Monné, leading experts on Neotropical Cerambycidae, who made me very welcome during my visit to Rio de Janeiro. Dr. M. A. Monné was also the collector, 30 years ago, of one of the type specimens of this interesting species. The name is a noun in the genitive plural.

**Distribution.** This species is only known from the Tijuca Forest National Park, Rio de Janeiro, a remnant of the Atlantic forest in southern Brazil.

#### A key to *Ivierhipidius* species

- 1 Larger species, more than 7 mm long (combined length of head, pronotum and elytra measured individually). Head with deep, pronounced longitudinal furrow between eyes extending from vertex to base of labrum (Figs 14–15). Eyes clearly emarginate. .... 2
- Smaller species, less than 6 mm long. Head without pronounced longitudinal furrow, sometimes with an impression between antennal insertions (Figs 12–13). Eyes not or hardly emarginate. .... 3
- 2 Elytra black, sharply contrasting with orange head, thorax and abdomen (Figs 5, 6). Argentina. .... *I. cechorum* sp. nov.
- Elytra orange brown, darkening to black at apex, not contrasting sharply with head, thorax and abdomen (Figs 7, 8). Brazil. .... *I. monneorum* sp. nov.
- 3 Head, thorax and elytra uniformly black, with only last antennomere strongly contrasting yellow. Elytra more than 2× as long as combined width (Figs 3, 4). Ecuador. .... *I. youngi* sp. nov.
- Head, thorax and elytra orange brown, elytra darkening toward apex. Elytral length less than 2× combined width (Figs 1, 2). Belize, Honduras. .... *I. paradoxus* sp. nov.

#### Discussion

The genus *Ivierhipidius* shares several morphological features with the Asian (Palearctic and Indian) genus *Pterydrius* Reitter, 1895, recently revised by BATELKA & HÁJEK (2009, 2010), but many of these are likely to be plesiomorphic. These include moveable mandibles, fully developed maxillary palpi and filiform antennae, characters which led KAUPP et al. (2001) to treat Eorhipidiini as Ripiphoridae incertae sedis and ŠVÁCHA (1994) to question its subfamily or family placement. Furthermore, *Ivierhipidius* has some character states even

more ancestral than Eorhipidiini, for example fully developed elytra (not just adjacent behind scutellum as in Eorhipidiini) and presence of tibial spurs. (KAUPP et al. (2001) state that tibial spurs are present in *Pterydrias januschevi* but BATELKA & HÁJEK (2009) demonstrate that this is not the case.) Most authors (FALIN 2002; BATELKA 2007, 2008) regard Eorhipidiini as a tribe within the subfamily Ripidiinae, and BATELKA & HÁJEK (2009, 2010) concur with this view, as well as referring to “undescribed Neotropical representatives tentatively attributed to Eorhipidiini” BATELKA & HÁJEK (2009), a clear reference to *Ivierhipidius* (in fact, specimens have been known and passed between entomologists for at least 20 years (M. A. Ivie, pers. comm.) without being formally described).

The shape of the head of *Ivierhipidius*, particularly the angle between the frons and the vertex, is unlike any species of Eorhipidiini and is somewhat reminiscent of some Ripiphorinae (*Macrosiagon* spp.). Without a thorough phylogenetic analysis of the Ripiphoridae and its relatives, in the absence of females, immature stages or biological information, and assuming many of their shared characters are likely to be plesiomorphic, I feel it is premature to assume a close relationship between the Neotropical *Ivierhipidius* and the Old World Eorhipidiini, and I thus prefer to retain *Ivierhipidius* in Ripiphoridae incertae sedis.

Males of the genus *Ivierhipidius* have been found in several European, North American and South American museums and private collections, usually misidentified at the family or even the superfamily level. They may be mistaken for other unmodified tenebrionoids such as Anthicidae, or, if the tarsal claws are not examined, for Meloidae or Tenebrionidae: Alleculinae, or, when hind tarsi are missing or tarsi are not counted, confused with some Elateroidea, especially Dascillidae: Karumiinae and Elateridae: Cebrionini, both of which have flightless females and males with a superficial resemblance, in habitus and mandible shape, to the new genus. It is interesting that *Ivierhipidius* was apparently unknown to older generations of entomologists, and no old specimens have been found. The huge collections of the BMNH, comprising some 10 million beetles, included no specimens older than the 1990s (though the collection is known to be weak in historic Neotropical material). The oldest known specimens (*Ivierhipidius monneorum* from MNRJ) only date back to the 1950s. The scarcity of old material may be in part because of the relatively recent development of interception trapping techniques (Malaise traps, flight intercept traps, window traps) which, when collecting data are recorded, are the main way in which flying males have been collected. However, collecting data is known only for *I. paradoxus*, and it seems likely from the collectors and circumstances that at least *I. monneorum* and *I. cechorum* were not collected in interception traps. They may have been collected at light, but are not labelled as such, and my own experience in Belize was that multiple light traps produced no specimens at a time when Malaise traps collected several *Ivierhipidius paradoxus*, suggesting that at least that species may not be attracted to artificial light (or may not fly at night). This is in contrast to *Pterydrias*; the type series of *P. januschevi* was collected at light (IABLOKOFF-KHNZORIAN 1986), and BATELKA & HÁJEK (2010) infer that some *P. debilis* specimens with Lepidoptera scales adhering to them may have been collected in the same way.

The female and immature stages of *Ivierhipidius* and *Pterydrias* are unknown, and BATELKA & HÁJEK (2009) speculate that larvae of the latter may be parasitoids of other insects, probably from the Hemimetabola and possibly termites, close relatives of the cockroach hosts of the

Ripidiini. Their suggestion of a hemimetabolous host possibly from or allied to the Blattodea, or the wider Polyneoptera, is also tempting for *Ivierhipidius*, and it is hoped that future studies will shed further light on the life history of this widespread and interesting group of beetles.

### Acknowledgements

I am grateful to the following friends and colleagues: Michael and Ladonna Ivie for their hospitality, encouragement and guidance in the early stages of this work, and persistent reminders to complete it; Michael Ivie and Daniel Young generously provided me all the with material they had assembled; Conrad Gillett and James Kitson ran a Malaise Trap for the BMNH during their MSc fieldwork in Belize, which produced the first two specimens that I saw and started the whole process; Howard Mendel, Donald Quicke, Tom Ensom, Gavin Broad and the late Nicodemus (Chapal) Bol accompanied me on fieldwork in Belize in 2010; Theresa Howard and Marilza Herzog enabled my visit to Brazil, where I took the opportunity to visit MNRJ and received kind hospitality from Marcela and Miguel Monné and their students. Stanislav Krejčík allowed me to describe a specimen from his collection. I am grateful to Petr Kment, Jan Batelka and Jiří Hájek for very helpful comments on the manuscript, and to the entomologists of the Czech Republic and particularly the staff of the NMP and members of the Czech Entomological Society for camaraderie and friendship over many years, as well as to the Coleoptera team (in its broadest sense), past and present, at the Natural History Museum.

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