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***Peruzuphium* n. gen. *giachinoi* new species of the tribe Zuphiini from Peru,
with notes on *Metaxidius brunnipennis* Chaudoir
(Coleoptera, Carabidae, Dryptinae)**

Abstract: *Peruzuphium* n. gen. *giachinoi* n. sp., a notable new species of the tribe Zuphiini from Peru with uncertain affinities, is described. It is the first zuphiine species recorded from Peru and is compared in particular to *Metaxidius brunnipennis* Chaudoir, another rare South American zuphiine species with uncertain affinities, which is discussed and illustrated too. A key to all genera of South American Zuphiini is finally provided.

Riassunto: *Peruzuphium* n. gen. *giachinoi* n. sp. della tribù Zuphiini dal Perù, con note su *Metaxidius brunnipennis* Chaudoir (Coleoptera, Carabidae, Dryptinae).

Viene descritto *Peruzuphium* n. gen. *giachinoi* n. sp., un nuovo interessante zuphiino del Perù ad affinità incerte. È la prima specie della tribù Zuphiini segnalata in Perù e viene confrontato in particolare con *Metaxidius brunnipennis* Chaudoir, altra rara specie sudamericana ad affinità incerte, che viene anch'essa discussa e illustrata. Viene infine fornita una chiave di identificazione per tutti i generi di Zuphiini sudamericani.

Key words: *Peruzuphium* n. gen., new genus, *Peruzuphium giachinoi* n. sp., new species, South America, *Metaxidius brunnipennis* Chaudoir, taxonomy, key to South American genera of Zuphiini.

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INTRODUCTION

The fauna of South American Zuphiini (Coleoptera, Carabidae) is far from being properly known. With the exception of *Coarazuphium* Gnaspini, Vanin & Godoy, 1998, a troglobitic genus currently including 16 species from Brazil and Mexico for the most part very recently described, and *Zuphioides* Ball & Shpeley, 2013, a newly created genus in order to include the species of the genus *Zuphium* already known from the Western Hemisphere, the remaining genera have attracted scarce taxonomic interest, so that the last species description dates back to 42 years ago (*Chaudoirella reichardti* Mateu, 1982). The reasons can be found in the rarity of many zuphiine species in nature and in the lack of information on their ecology, thus resulting scarcely represented in collections, as well as in the difficulty of studying for comparison old types sometimes damaged or lost. It is also indicative that the most comprehensive taxonomic review concerning the genera of Zuphiini richest in species in South America, *Pseudapt-*

inus Castelnau de Laporte, 1834 and *Thalpius* LeConte, 1851 (the latter sometimes considered as a subgenus of *Pseudaptinus*), dates back to exactly 90 years ago (Liebke, 1934).

In the Giachino collection, among the material collected by M. Etonti in Peru, a single male specimen undoubtedly belonging to the tribe Zuphiini was found, not matching with any of the already known species, although showing some external morphological similarities with another rare and enigmatic zuphiine species from South America, *Metaxidius brunnipennis* Chaudoir, 1852. The comparison of the specimen from Peru with the HT of *M. brunnipennis* deposited at the *Muséum National d'Histoire Naturelle*, Paris, allowed us to ascertain their different specific as well as generic status.

In this paper, *Peruzuphium* n. gen. *giachinoi* n. sp. is described and illustrated. Moreover, some taxonomic, nomenclatural and chorological aspects regarding *M. brunnipennis* are discussed, and a photographic

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picture of the holotype is provided, as it was previously illustrated in the literature only by schematic drawings. Finally, a key to all genera of South American Zuphiini is provided.

MATERIAL AND METHODS

The specimens studied or mentioned in the text are deposited in the following museums and private collections:

CAI = G. Allegro Collection (Moncalvo, Asti, Italy).

MNHNP = Muséum National d'Histoire Naturelle, Paris, France.

MCSNG = Museo Civico di Storia Naturale "G. Doria", Genova, Italy.

The abbreviations used for type material are:

HT = holotype.

The type locality is quoted in the original label form.

Apparent body length (ABL) is measured from apex of labrum to apex of longest elytron. PW: pronotum width at the widest point; PL: pronotum length measured from apical to basal margin along midline; EW: elytral width at the widest point; EL: elytral length from base of scutellum to apex of longest elytron.

Digital images of *Peruzuphium giachinoi* n. sp. were taken with a Leica DFC295 camera mounted on a Leica M205 C stereomicroscope, using Leica Application System V4.0 software.

RESULTS

Genus *Peruzuphium* gen. nov.

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Type species. *Peruzuphium giachinoi* n. sp.

Differential diagnosis. A genus of the tribe Zuphiini Bonelli, 1810 distinguished from the other South American genera of the same tribe by the following set of characters:

- from *Coarazuphium* and *Zuphioides* by maxillary palpi much larger than labial palpi, with maxillary palpomere 4 markedly enlarged (*vs.* maxillary and labial palpi similar to one another in size and proportions and maxillary palpomere 4 not markedly enlarged), and by head posteriorly less constricted

(*vs.* head posteriorly markedly constricted as a narrow neck);

- from *Mischocephalus* and *Chaudoirella* by head posteriorly with neck thick, much wider than diameter of eye (*vs.* head posteriorly constricted in a very narrow neck, more or less as wide as diameter of eye);
- from *Pseudaptinus* and *Thalpius* by pronotum transverse, wider than long along the mid-line, with posterior angles right and sharp, without a laterally prominent spine (*vs.* pronotum usually longer than wide, or at least as long as wide, with posterior angles blunt, with or without a laterally prominent spine before posterior angles);
- from *Metaxidius* by basal antennomeres elongate, the first one as long as antennomeres 2-3 together (*vs.* basal antennomeres very short, the first one as long as antennomeres 2-4 together) and eyes small, with genae 1.5 times longer than diameter of eye (*vs.* eyes normally developed, with genae shorter than diameter of eye).

Moreover, it can be distinguished from the genera of the tribes of closest phylogenetic affinity (Dryptini and Galeritini) by the following set of characters (Reichardt, 1967):

- from Dryptini by antennal scape shorter than head (*vs.* longer than head), mandibles normally elongated (*vs.* markedly elongated), fourth tarsal segment not bilobed (*vs.* bilobed);
- from Galeritini by anterior tarsi of male with basal segments symmetrically dilated (*vs.* asymmetrically dilated).

Description. Genus of Carabidae Zuphiini currently including one only small-sized species (*Peruzuphium giachinoi* n. sp.). ABL: 5.40 mm (HT ♂).

Habitus and color. Body parallel-sided, pubescent throughout, head and pronotum shiny, elytra dull, concolorous light brown with mouth parts, antennae and legs a little paler (Fig. 1). Females unknown.

Head. Laterally convex, narrow in comparison with pronotum (Fig. 2), dorsally coarsely punctate, posteriorly abruptly constricted in a thick neck nearly 3 times wider than diameter of eye; collar constriction dorsally evident; ocular area globose and eyes small, oval, scarcely protruding (Fig. 4); two supraorbital setae on each side; microsculpture distinct in polygonal isodiametric meshes; frontal impressions deep, short and di-

vergent, ending before the anterior supraorbital seta; genae convex, pubescent and 1.5 times longer than diameter of eye; a narrow supraorbital carina not dilated above antennal insertion; labrum rectangular, with six setigerous punctures on anterior margin, which is slightly concave with a very small central tooth; clypeus transverse trapezoid, rectilinear anteriorly with a small, blunt central tooth; a couple of central setae at anterior margin of clypeus and three further setae at each side, respectively in anterior, middle and posterior position. Antennae moderately long, hardly surpassing base of pronotum when stretched backwards, densely pubescent and progressively thicker towards apex; the first antennomere as long as antennomeres 2-3 together, the last one 1.5 times longer than penultimate. Mandibles moderately long, with glabrous scrobe, pointed and abruptly curved at apex, narrowly darkened at inner side (Fig. 2). Mentum clearly broader than long, sparsely pubescent, anterior margin shallowly emarginate; epilobes rather broad, laterally prominent; mentum tooth widely rounded and not exceeding level of epilobes; suture between mentum and submentum present. Maxillary palpi much larger than labial palpi, with palpomere 4 markedly enlarged; penultimate labial palpomere multisetose with one pair of major erect setae on anterior margin.

Thorax. PL: 1.15 mm; PW: 1.24 mm; PW/PL: 1.08. Pronotum coarsely punctate throughout, with fine and superficial microsculpture; form subquadrate, broader than long at the midline, widest at anterior third; side margins regularly rounded at anterior half and delicately sinuate backwards; hind angles right-angled, sharp and with a postangular seta; posterior margin broadly but shortly pedunculate at middle; basal impressions short, broad and markedly impressed; anterior margin with front angles almost absent; a lateral seta at anterior fifth on each side; postangular seta present; lateral marginal bead narrow on overall length (only slightly broader towards base) and narrowly darkened; anterior submarginal sulcus hardly distinct; medial longitudinal sulcus deep, ending just before apex and base (Fig. 3).

Elytra. EL: 2.71 mm; EW: 1.90 mm; EL/EW: 1.43. Sub-parallel sided, moderately convex and flattened on disc, narrower at base and widest towards apex, with shoulders rounded and prominent forwards; not sinuate before apex, which is roundedly truncate. Surface dull, rugulose; microsculpture distinct. Epipleura

without distinct external plicae ('crossed epipleura'). Intervals moderately convex, distinctly punctate and rugulose; striae deeply impressed for whole length, distinctly punctate. Parascutellar stria absent; scutellar setigerous pore present between striae 1 and 2, adjacent to the first stria. Basal margin nearly indistinct. Each elytron with rounded sutural apex. Discal setigerous punctures absent; umbilicate series composed of 16 punctures in an almost continuous series from humeri to apex; the punctures 3-12 slightly moved inwards. Hind wings absent.

Ventral surface (thorax and abdomen)

Prosternum and proepisterna pubescent and punctate. Mesosternum pubescent, densely and rugosely punctate. Metepisterna short, subquadrate, delicately punctate. Prosternal intercoxal process broadly rounded at apex and apically setose. Sterna densely pubescent.

Legs. Moderately short, pubescent throughout. Metatrochanters slightly shorter than half length of metafemora. Protibial antennal cleaning organ well developed, with two clip setae. Protibiae short, robust and longitudinally rugose, with a strong apical spur and a small apical tooth; mesotibiae and metatibiae short (about as long as tarsi), laterally flattened and curved inwards at apex, without spines except the apical ones, with an apical crown of brush-like setae. Tarsomeres dorsally convex; protarsomeres short, moderately and symmetrically dilated, the first one 1.5 times longer than 2nd and 3rd, which are globular, the 4th concave at apex; mesotarsomeres slightly dilated too; metatarsomeres very slender, the first one 2.5 times longer than 2nd; onychium with a double row of adhesive setae; claws smooth. Femora of HT seem collapsed as in consequence of a scarce chitinization; this can suggest that the specimen is immature, but any other organ, aedeagus included, appears normal and not deformed.

Male genitalia. Median lobe of aedeagus in lateral view almost rectilinear for most length, markedly bent downwards at apex, with small basal bulb (Fig. 5); in dorsal view more or less regularly narrowed from base to apex, slightly sinuate at the right side just before apical blade, which is long and sub-triangular, blunt at apex (Fig. 6). Ostium moderately long, placed in dorsal position, as long as half length of median lobe, not reaching basal bulb. Right paramere small and narrow,

elongate. Male gonosomite (IX invaginated abdominal segment) ovoidal with the proximal apophysis sub-triangular and apically truncate (Fig. 7).

Remarks. The attribution of this new genus to the tribe Zuphiini is supported by a set of characters that are recurrent in this tribe and can be regarded as synapomorphic, such as the depressed body, the antennae and legs pubescent throughout, the first antennomere elongate and longer than followings, the elytra apically truncate, the absence of elytral discal punctures, the male protarsomeres symmetrically and only moderately dilated, the presence of a parascutellar setigerous pore adjacent to the first stria. *Peruzuphium* n. gen. cannot be attributed to Dryptini nor to Galeritini, which are the tribes of closest phylogenetic affinity of Zuphiini (Will & Maddison, 2006), by the features showed in diagnosis.

It is not possible, at the present status of knowledge, to make phylogenetic assumptions concerning the closest relatives of *Peruzuphium* n. gen.; probably these could be found among *Metaxidius* or some brachypterous South American *Thalpius* living in forest litter (unpublished data), but all these show such important morphological differences from *Peruzuphium* n. gen. to make it deserve the rank of separate, probably phylogenetically isolated, genus.

Etymology. The genus name is derived from the crasis of the name of the origin country of the type species (Peru) with the genus name *Zuphium*. The name is neutrum.

***Peruzuphium giachinoi* n. sp.** (Figs. 1-7)

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Type locality. Peru, Pasco, Oxapampa S. Alberto, m 2000.

Type Series. Holotype ♂: Peru, Pasco, Oxapampa S. Alberto, m 2000, 9.III.1994, M. Etonti leg. (CAI, provisionally deposited at author's address, then at MCSNG).

Differential diagnosis. A small-sized (ABL: 5.40 mm) brachypterous zuphiine pubescent throughout with body concolorous light brown, eyes small, genae long and convex, maxillary palpi much larger than labial

palpi, scarcely pigmented and entirely pubescent body, two supraorbital setae, mentum tooth with simple rounded apex, pronotum wider than long with basal angles sharp and right, a scutellar setigerous pore between striae 1 and 2 adjacent to the first stria, elytral striae distinctly impressed, punctate, with intervals rugulose, discal setae on elytra absent, sutural apex of each elytron rounded, prosternal intercoxal process broadly rounded at apex and apically setose, legs short with meso- and metatibiae laterally flattened, tarsomeres dorsally pubescent, mentum tooth not exceeding level of epilobes. It is easily distinguished from the unique other South American zuphiine species with pronotum similarly shaped (*Metaxidium brunnipennis* Chaudoir) by smaller eyes and longer genae, concolorous light brown body color and more slender antennomeres.

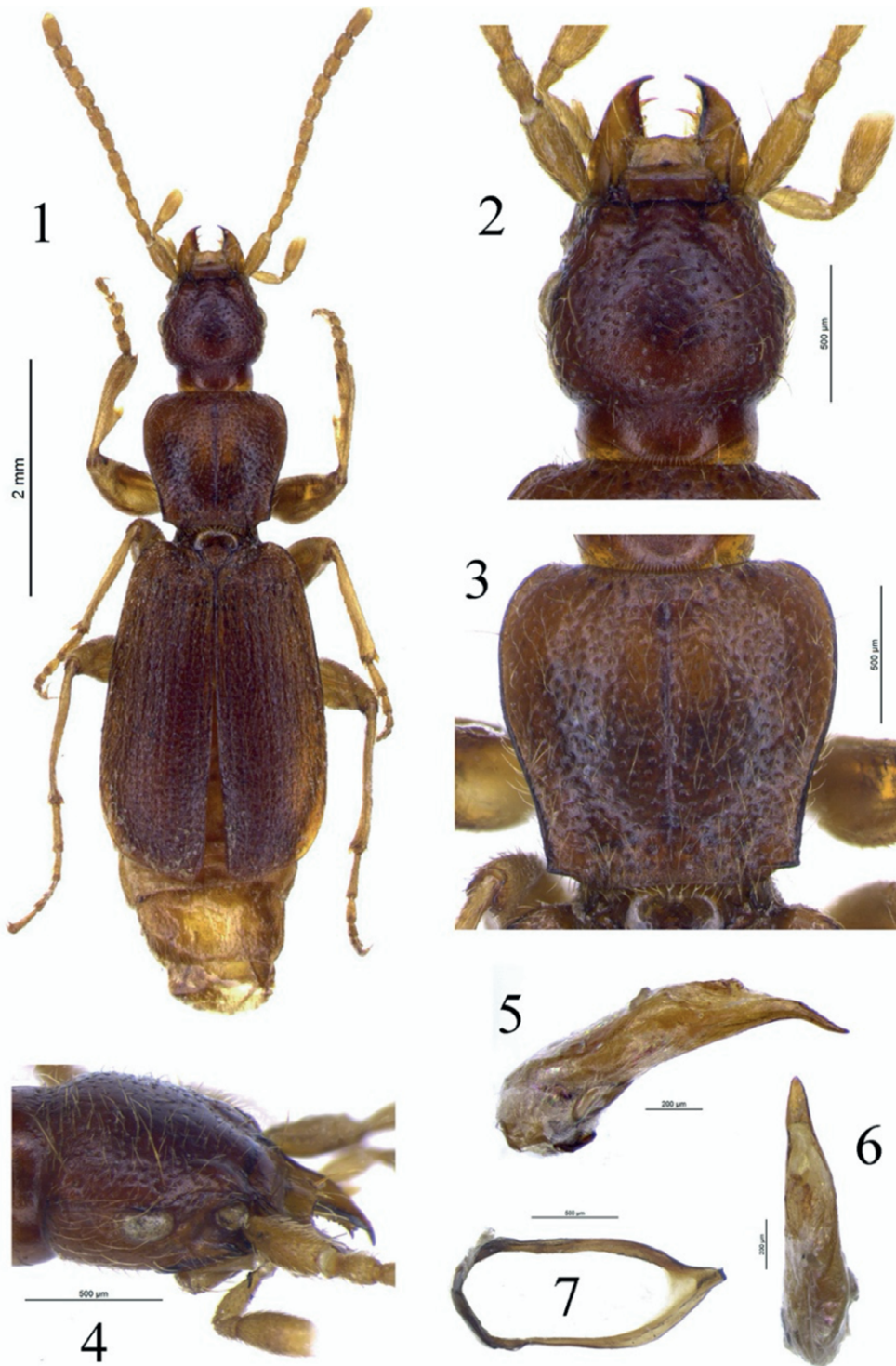
Description. The description of *Peruzuphium giachinoi* n. sp. is coincident with the description of the genus.

Remarks. For phylogenetic assumptions see Genus remarks.

Distribution and ecology. Geographical distribution: this species is recorded only from Oxapampa San Alberto, Pasco, in the Peruvian Andes.

Life habits: the unique specimen forming the typical series of *Peruzuphium giachinoi* n. sp. was collected at 2000 meters of altitude a.s.l.; no data are available on the sampling technique adopted and on the habitat preferences of this species. Anyway, depigmentation of body, reduction of eyes and brachyptery could be supposed as adaptive traits of *E. giachinoi* n. sp. to life in forest soil litter. This could be consistent with the prevailing environment in the area of type locality. Moreover, some peculiar morphological traits like legs short, tibiae flattened and a brush-like organ at apex of tibiae could suggest a link to a behavior involving some degree of mirmecophily, as these characteristics are often encountered in Paussini and Ozaenini, which are characterized by obligatory myrmecophily (Darlington, 1950). Anyway, no data in this sense are currently available for Zuphiini and further investigation is required.

Etymology. I am pleased to dedicate this interesting species to my friend and colleague Pier Mauro Giachino, as a sign of friendship and gratitude for his teachings in the study of world Carabid Beetles.



Figs. 1-7. *Peruzuphium giachinoi* n. sp.: 1) holotype habitus; 2) head in dorsal view; 3) pronotum; 4) head in latero-dorsal view; 5) median lobe of aedeagus in lateral view; 6) median lobe of aedeagus in dorsal view; 7) male gonosomite (IX invaginated abdominal segment).

***Metaxidius brunnipennis* Chaudoir, 1852** (Fig. 8)

Remarks. The taxonomic position of *M. brunnipennis* inside Zuphiini was definitely stated by Reichardt (1972) after previous authors had considered it as intermediate between Zuphiini and Helluonini (Chaudoir, 1852; Lacordaire, 1854) or had placed it inside Helluonini (Csiki, 1932; Blackwelder, 1944). Reichardt (1972) was convinced of his opinion after studying the holotype deposited at MNHNP, when he could examine some characters that were not clearly evident from Chaudoir's description. By the way, he highlighted that this specimen was very poorly preserved, and that some characters were uncheckable: in particular, he affirmed that no setae were preserved and that pronotum and elytra were glabrous. In our opinion, the absence of body pubescence, a very rare character among Zuphiini, could be a consequence of a bad state of conservation of the specimen and therefore this character should not be considered as distinctive of the species.

A photographic picture of the habitus of the HT, de-



Fig. 8. Holotype habitus of *Metaxidius brunnipennis* Chaudoir, 1852.

posited at MNHNP, is provided (Fig. 8), as this species had been previously illustrated in the literature only by schematic drawings (Reichardt, 1972; Martinez, 2005). Concerning the nomenclature of this species, Lorenz (2005) in his recent catalogs used the spelling “*Metaxidius brunnipennis*”, *i.e.*, the original spelling in Chaudoir's description (1852). This original spelling clearly derives from a typographical error because: i) the holotype bears a label handwritten “Brunnipennis Chaud.”; and ii) the epithet is in agreement with the color of elytra (*pennis*) of this species (dark brown), in contrast with the reddish color of head and pronotum, and does not have anything to do with the color of male genitalia, which is unknown. Because of this, the name was already changed to “*brunnipennis*” a long time ago by Blackwelder (1944), and subsequent authors used that changed spelling (Reichardt, 1977; Martinez, 2005). According to the Code, “*brunnipennis*” is an incorrect subsequent spelling. Anyway, since it is in prevailing usage, we therefore here use “*brunnipennis*” under art. 33.3.1. The distribution of *M. brunnipennis* in South America is not clear. The holotype bears a label with the generic indication “Amér. Aequinoct.”. Reichardt (1977, p. 449) reports a further record from Montevideo, Uruguay, thus confirming the South American distribution of this species. Anichtchenko *et al.* (2007-2024) report a distribution of this species in Argentina and Uruguay, but no further record of distribution was found in the literature.

CONCLUSIONS

After the rare and enigmatic zuphiine *Metaxidius brunnipennis*, which is morphologically well distinct from all other known South American species of this tribe, a further zuphiine species, *Peruzuphium giachinoi* n. sp., raises many questions concerning its phylogenetic affinities. Although sharing some external similar features, *P. giachinoi* n. sp. and *M. brunnipennis* show so important differences in habitus that the new species deserves the rank of a separate genus. Unfortunately, a conclusive comparison is not possible due to very bad conservation status of the HT of *M. brunnipennis*; moreover, male genitalia of this last species are unknown and therefore cannot be compared.

The likely adaptation of *P. giachinoi* n. sp. to life in soil litter and, mainly, the hypothesized link to mirmecophily make it a very interesting species, probably phylogenetically isolated inside the tribe Zuphiini.

Moreover, *P. giachinoi* n. sp. seems geographically isolated too, as no other zuphiine species were known to date from Peru (Erwin *et al.*, 2015).

Key to South American genera of the tribe Zuphiini (modified from Ball & Shpeley, 2013, and Mateu, 1992)

1. Maxillary and labial palpi similar to one another in size and proportions; maxillary palpomere 4 not markedly enlarged. Male protarsomeres 1-3 with adhesive vestiture pad-like, not biseriata or with a single row of squamo-setae2.
 - Maxillary palpi much larger than labial palpi; maxillary palpomere 4 markedly enlarged. Male protarsomeres 1-3 with adhesive vestiture biseriata, or a single row of squamo-setae3.
2. Eyes absent or flat, ommatidia not evident. Metepisterna about quadrate. Elytral humeri markedly constricted. Elytra oval elongate, with lateral margins broadly rounded. 15 Species from Brazil and one from Mexico ... **Coarazuphium** Gnaspini, Vanin & Godoy, 1998 (type species: *Parazuphium tessai* Godoy & Vanin, 1990).
 - Eyes convex, normally sized, with ommatidia evident. Metepisterna elongate, longer than wide at base. Elytral humeri broadly rounded. Elytra with sub-parallel sides. 23 species from Western Hemisphere ... **Zuphioides** Ball & Shpeley, 2013 (type species: *Zuphium mexicanum* Chaudoir, 1863).
3. Head posteriorly constricted in a very narrow neck (more or less as wide as diameter of one eye)4.
 - Head posteriorly with thick neck (wider than diameter of one eye)5.
4. Elytra with sub-parallel sides for most length. Posterior angles of pronotum long and spiniform, laterally very prominent. One species from Central and South America ... **Mischocephalus** Chaudoir, 1863 (type species: *Mischocephalus spinicollis* Chaudoir, 1863).
 - Elytra with sides broadly rounded. Posterior angles of pronotum with short prominent spines. One species from Brazil ... **Chaudoirella** Mateu, 1982 (type species: *Chaudoirella reichardti* Mateu, 1982).
5. Pronotum transverse, wider than long, with posterior angles right, without laterally prominent spine at posterior angles6.
 - Pronotum usually longer than wide, or at most as long as wide, with or without a sharp, laterally prominent spine at posterior angles.....7.
6. Basal antennomeres very short, the first one as long as antennomeres 2-4 together. Eyes normally developed, genae shorter than diameter of eye. One species from South America (Argentina?, Uruguay?) ... **Metaxidius** Chaudoir, 1852 (type species: *Metaxidius brunnipennis* Chaudoir, 1852).
 - Basal antennomeres more elongate, the first one as long as antennomeres 2-3 together. Eyes small, genae 1.5 times longer than diameter of eye. One species from South America (Peru) ... **Peruzuphium** n. gen. (type species: *Peruzuphium giachinoi* n. sp.).
7. Posterior angles of pronotum not spined. Antennae sometimes (not always) sharply bicolored, with 5-6 apical antennomeres paler. 18 species from Western Hemisphere ... **Pseudaptinus** Laporte, 1834 (type species: *Polistichus albicornis* Klug, 1834).
 - Posterior angles of pronotum each with a sharp spine laterally prominent. Antennae always in solid color. 36 species from Western Hemisphere and Australia ... **Thalpius** LeConte, 1851 (type species: *Helluo pygmaeus* Dejean, 1826).

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REFERENCES

- ANICHTCHENKO A., *et al.*, 2007-2024 - Carabidae of the World. Available from: <http://carabidae.org> (accessed 30 January 2024).
- BALL G.E., SHPELEY D., 2013 - Western Hemisphere Zuphiini: descriptions of *Coarazuphium whiteheadi*, new species, and *Zuphioides*, new genus, and classification of the genera (Coleoptera, Carabidae). *Zookeys*, 315: 17-54.
- BLACKWELDER R.E., 1944 - Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. United States National Museum Bulletin 185, 188 pp.
- CHAUDOIR M. DE, 1852 - Mémoire sur la famille des carabiques. Bulletin de la Société Impériale des Naturalistes de Moscou, 25(1): 3-104.
- CSIKI E., 1932 - Carabidae: Harpalinae VII. *Coleopterorum Catalogus, Pars 124*: 1279-1598.
- DARLINGTON P.J. JR., 1950 - Paussid Beetles. *Transactions of the American Entomological Society*, 76(2): 47-142.
- ERWIN T.L., MICHELI C., CHABOO C.S., 2015 - Beetles (Coleoptera) of Peru: A Survey of the Families. Carabidae. *Journal of the Kansas Entomological Society*, 88(2): 151-162.
- LACORDAIRE J.T., 1854 - *Génera des Coléoptères 1*. Paris, 486 pp.
- LIEBKE M., 1934 - Die Arten der Gattung *Pseudaptinus* Cast. (Col. Carabidae). *Revista de Entomologia*, 4(3): 372-388.
- LORENZ W., 2005 - Systematic list of extant Ground Beetles of the World (Insecta Coleoptera Geadephaga: Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae). Tutzing, 530 pp.
- MARTINEZ C., 2005 - Introducción a los escarabajos Carabidae (Coleoptera) de Colombia. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá, 546 pp.
- MATEU J., 1982 - *Chaudoirella reichardti* nouveau genre et n. sp. de Patriziini de l'Amérique néotropicale (Coleoptera Carabidae). *Nouvelle Revue d'Entomologie*, 12(1): 45-51.
- MATEU J., 1992 - Du nouveau sur les subtribus de Zuphiini et description d'une nouveaux genre et d'une nouvelle espèce de cette tribu (Coleoptera, Carabidae, Zuphiini). *Entomologica Basiliensia*, 15: 195-204.
- REICHARDT H., 1967 - A monographic revision of American Galeritini (Coleoptera, Carabidae). *Arquivos de Zoologia, S. Paulo*, 15(1-2): 1-176.
- REICHARDT H., 1972 - *Metaxidius* Chaudoir and the neotropical Zuphiini (Coleoptera, Carabidae). *Papéis Avulsos de Zoologia, S. Paulo*, 25(25): 265-268.
- REICHARDT H., 1977 - A synopsis of the genera of Neotropical Carabidae (Insecta (Coleoptera)). *Quaestiones Entomologicae*, 13: 346-493.
- WILL K., MADDISON D.R., 2006 - Harpalinae. Version 07 July 2006 (under construction). The Tree of Life Web Project. Available from: <http://tolweb.org/Harpalinae/100/2006.07.07>