



Taxonomy / Taxonomie

A new genus of Kimulidae; first record of the family from Colombia (Opliones, Grassatores)

Un nouveau genre de Kimulidae ; premier registre de la famille pour la Colombie (Opiliones, Grassatores)

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ABSTRACT

Usatama gen. nov. is described to include a new species of Kimulidae from Colombia. This is the first record of the family from the country. The new genus presents a weakly armed ocularium, feeble sexual dimorphism, and unique genital structure with three parallel horseshoe-shaped girdles in pars distalis and absence of cochleariform macrosetae.

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R É S U M É

Usatama gen. nov. est décrit pour inclure une nouvelle espèce de Kimulidae de Colombie. Ceci constitue le premier registre de la famille pour le pays. Le nouveau genre présente un ocularium faiblement armé, un dimorphisme sexuel faible et une structure génitale unique, caractérisée par trois ceintures parallèles en forme de fer à cheval en pars distalis et l'absence de macrosetae cochleariformes.

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1. Introduction

Kimulidae is a family of sturdy and bumpy Zalmoxoidea, second only to Zalmoxidae in diversity within the superfamily (10 genera, 36 species), known mostly from Venezuela, the Greater Antilles and also isolated in NE Brazil and caves in SE Brazil [1–3]. They are dull brown

colored animals, inhabiting the leaf litter. Pérez-González et al. [3] had already reported many undescribed kimulids from Central America and northwestern South America. Herein we formally describe the first member of this family from Colombia, thus expanding the range of the family hundreds of km southwestwards into the Andes mountain range.

A possible synapomorphy for the family is the set or girdles or flanges present on the pars distalis of penis, the so-called lamina inferior [4] or lamina ventralis [3]. These flanges are flattened and horseshoe-shaped, encircling the

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capsula interna from the ventral side to touching (or at least getting closer) its left and right tips on the dorsal side.

2. Material and methods

Specimens were photographed using a Leica M205C stereoscope attached to a Leica DFC450 digital camera and were posteriorly edited in Photoshop CC 2014 software. Drawings of the species were made using Inkscape 0.91 software and CorelDRAW v.20.0. Scanning Electron Microscopy was carried out with a scanning electron microscope (Jeol JSM-6390LV) belonging to the Rudolf Barth Electron Microscopy Platform of the Oswaldo Cruz Institute/Fiocruz.

The morphological descriptions follow Pérez-González et al. [3], Kury and Medrano [5] for dorsal scutum, coda and other anatomic terms. Descriptions of colors use the standard names of the 267 Color Centroids of the NBS/IBCC Color System [6] as described in Kury and Orrico [7].

Abbreviations cited: AW = maximum abdominal scutum width, CL = carapace length, CW = maximum carapace width, DS = dorsal scutum, DSL = dorsal scutum length, PB = pars basalis, PD = pars distalis, Tr = trochanter, Fe = femur, Pa = patella, Ti = tibia, Mt = metatarsus, Ta = tarsus.

The set of horseshoe-shaped girdles that embrace and cover the capsula interna was called “lamina inferior” by Sørensen in [4] and “lamina ventralis” by Pérez-González et al. [3]. Such names are neutrally descriptive; however, we think that the use of lamina ventralis (which translates as “ventral plate”) might bring an undesirable idea of homology between this structure and the ventral plate present in Gonyleptoidea, even giving the name to the taxon Laminata [8,9]; therefore, we prefer to use the term “lamina inferior” in this work. The lamina inferior is made up by a set of girdles herein called U-flakes. Tarsal formula: numbers of tarsomeres in tarsus I to IV, when an individual count is given, order is from left to right side (the figures in parentheses denote the number of tarsomeres only in the distitarsus I–II). All measurements are in mm.

The studied material is deposited in MNRJ (Museu Nacional, Rio de Janeiro, Brazil. Curator: Adriano B. Kury).

3. Critical systematic background

What is now called Kimulidae started with Sørensen (in Henriksen) [4], who erected the Minuidae containing the seven new genera *Acanthominua* Sørensen, 1932, *Euminua* Kury and Alonso-Zarazaga, 2011, *Kalominua* Sørensen, 1932, *Microminua* Sørensen, 1932, “*Minua*” Sørensen, 1932, *Minuides* Sørensen, 1932 (all from Venezuela), and *Phera* Sørensen, 1932 (from southern Brazil). In a work very meager in illustrations, it is surprising to find some images of male genitalia for species of Minuidae, which are crude, but nevertheless, allowed future familial assignments. Two of the included genera, *Minua* and *Euminua*, were invalid because described after 1930 without designation of a type species, but it took six decades for this fact to be noticed. Sørensen’s Minuidae were included in the superfamily Phalangodoidea by the editor of his posthumous work [4], along with many subfamilies of Phalangodidae recently described by Roewer. Henriksen [4] made it clear that

Sørensen’s families corresponded to Phalangodidae subfamilies as used by Roewer [10]. Mello-Leitão [11] tried to accommodate the new families created by Sørensen (vaguely suggesting including Minuidae in Phalangodinae) into Roewer’s system, by demoting them to subfamilies of Phalangodidae. He also created yet another subfamily, the Minuidinae Mello-Leitão, 1933, composed by two monotypic genera: *Minuides* Sørensen, 1932 and *Pseudominua* Mello-Leitão, 1933 (dismembered from *Euminua*). Mello-Leitão [12] further dismembered *Euminua*, creating the monotypic genus *Euminuoides* Mello-Leitão, 1935.

Mello-Leitão [13] decided to accept Minuinae as a subfamily separated from the Phalangodinae, with the exception of *Microminua*, which went to the Phalangodinae. *Microminua* was returned to Minuidae by Kury [14], and finally transferred to Samoidae by Kury and Pérez-González [15], who synonymized *Cornigera* González-Sponga, 1987 with it.

Goodnight and Goodnight [16] were ultra-Roewerian in not recognizing Minuinae as distinct from Phalangodinae, and by describing in this subfamily the new monotypic genus *Kimula* Goodnight and Goodnight, 1942, from Puerto Rico, which was later recorded also from Cuba [17].

Roewer (e.g., [18]) never cited Minuinae either as a separate family or as a subfamily of Phalangodidae. He created the new monotypic genus *Minuella* Roewer, 1949 by dismembering from *Minua*. He never noticed that *Minua* was invalid, as wrongly suggested later by González-Sponga [19]. Roewer, in the same paper, described in Phalangodinae the monotypic genus *Tegipiolus* Roewer, 1949 from NE Brazil, only much later discovered to be a kimulid.

H. Soares [20] inflated the fictitious SE Brazilian representation of Minuinae, describing two new genera from southeastern Brazil: *Pirassunungoleptes* H. Soares, 1966 (transferred to Zalmoxidae by Kury [14]) and *Spaeleoleptes* H. Soares, 1966 (transferred to Escadabiidae by Kury and Pérez-González [21]).

Šilhavý [22] increased the knowledge of the family (which incidentally he did not recognize as such) from Cuba, by describing some new species of *Kimula*, accompanied by beautiful drawings of the habitus of males and images of the extravagant male genitalia of this genus. Avram [39] erected the new subgenus of *Kimula*, *Metakimula* Avram, 1973 along with a new species from Cuba. Šilhavý [23] and González-Sponga [19] considered both subfamilies Minuinae and Minuidinae as synonyms of Phalangodinae.

González-Sponga [19] mistakenly concluded from Roewer’s paper that *Minua* was a synonym of *Minuella*: “Roewer (1949: 40) crea el género *Minuella* colocando como sinonimia de este a *Minua* Sorensen, 1932.” What in fact happened is that Roewer only picked out one species of *Minua* to create *Minuella* (although he cited no difference between both alleged genera, presenting only a non-comparative diagnosis for *Minuella*). But in the end González-Sponga’s usage of *Minuella* somehow proved to be right, because *Minua* was much later discovered to be invalid.

Kury [24], puzzled by the dissonant southern Brazilian distribution of the genus *Pherania* Strand, 1942 (originally called *Phera* Sørensen, 1932, but preoccupied by a genus nomen in Hemiptera), studied the type material of *Phera pygmaea* Sørensen, 1932, and discovered its gonyleptid

affinities, placing it at first in Pachylinae and later into the synonymy of *Tricommatus* Roewer, 1912 in Tricommatinae [8].

In his unpublished Ph.D. thesis, Kury [25] recognized a large superfamily Zalmoxoidea, including Biantidae, Minuidae, Podoctidae, Samoidea, Stygnommatidae and Zalmoxidae, but this name appeared in press only much later [26].

González-Sponga [27] erected in Phalangodinae the monotypic genus *Fudeci* González-Sponga, 1998, from a tepui in Bolívar, Venezuela. This was transferred later by Kury [14] to Minuidae. Pérez-González [35] reviewed the genus *Kimula* in an unpublished MSc dissertation.

Kury [14] reestablished Minuidae as a distinct family, enlarging it with the inclusion of some Antillean (*Kimula*, *Metakimula*, this elevated from subgenus) and Venezuelan (*Fudeci*) genera of Phalangodinae and both genera of Minuidinae (*Minuides*, *Pseudominua*), while transferring three other genera (*Kalominua* to Samoidea, *Pirassunungoleptes* to Zalmoxidae, *Spaeleoleptes* to family uncertain). Kury's catalogue [14], in spite of being published only in 2003, was prepared in the late 1990s and sat waiting for a suitable channel for publication. Meanwhile, a new ICZN Code was published, and Kury overlooked Article 16.1, which stated that new names published after 1999 should be explicitly proposed as new, also overlooking that *Minua* and *Euminua* did not fulfill the requirements of Article 13.3, being published after 1930 without designation of a type species, which also affected the name Minuidae.

Alonso-Zarazaga teamed up with Kury to prepare a list of addenda (and nomenclatural) corrigenda to the 2003 catalogue [28], and he was the first to detect the problem with the nomen Minuidae, but before this was ready for publication, a rushed teamwork project (a famous Opiliones textbook [29]) demanded that a replacement name was given to the Minuidae. Roughly at the same time, Pérez-González [30] made a substantial Ph.D. thesis on Stygnommatidae, supervised by A.B. Kury, and commented on Kimulidae, its nomenclature, morphological key features and possible kinship with Escadabiidae. In the 2006 thesis, Pérez-González suggested that *Acanthominua*, *Euminua*, *Euminuoides*, *Minuides*, and *Pseudominua* should all be transferred to Zalmoxidae (all of these were formalized in print later). Some information from this thesis ended up in a chapter of the Opiliones textbook [31], including the new name for the family, Kimulidae, as the authors did not like alternatives such as "Minuellidae". Pérez-González and Kury [31] also included *Tegipiolus* from NE Brazil in Kimulidae and transferred *Minuides* to the Zalmoxidae, automatically carrying the synonymy of the *Minuidinae*. Kury and Alonso-Zarazaga [28] at long last formally described *Euminua*.

Kury and Pérez-González [15] transferred *Microminua* from Kimulidae to Samoidea; however, the second species of *Microminua* (*Microminua soerenseni* Soares and Soares, 1954, from SE Brazil) was transferred to *Tibangara* Mello-Leitão, 1940, in Cryptogeobiidae.

Finally, Pérez-González et al. [3] described a new monotypic genus, *Relictopiolus* Pérez-González, Monte and Bichuette, 2018, from a cave system in SE Brazil, and

formalized the transfer of some false kimulids (*Acanthominua*, *Euminua*, *Euminuoides* and *Pseudominua*) to Zalmoxidae. They also presented a molecular phylogeny in that Kimulidae appeared nested inside Escadabiidae and commented on the so far unrecorded distribution of Kimulidae. The expansion of the records of the family from Colombia appeared recently several times in congress abstracts [36–38].

Giribet and Kury [32] divided Kury's superfamily Zalmoxoidea into Zalmoxoidea (Icaleptidae, Guasiniidae, Zalmoxidae + Fissiphalliidae), and Samooidea (Samoidea + Podoctidae + Biantidae + Minuidae + Stygnommatidae). Giribet et al. [33] included in Zalmoxoidea the same Fissiphalliidae, Guasiniidae, Icaleptidae, and Zalmoxidae, with a paraphyletic Samooidea as a sister group. Sharma and Giribet [34] augmented Zalmoxoidea transferring Escadabiidae and Kimulidae to it, resulting in six included families (Escadabiidae, Fissiphalliidae, Guasiniidae, Icaleptidae, Kimulidae, Zalmoxidae), while Samoidea had (Samoidea + Biantidae + Stygnommatidae). Since this, the inclusion of Kimulidae in Zalmoxoidea has not been challenged (e.g., Sharma and Giribet [40]).

4. Systematic accounts

KIMULIDAE PÉREZ-GONZÁLEZ, KURY AND ALONSO-ZARAZAGA, 2007

- Minuidae Sørensen in Henriksen 1932: 227 (incl. *Acanthominua*, *Euminua*, *Kalominua*, *Microminua*, *Minua*, *Minuides*, *Phera*). Type genus by original implicit etymological designation: *Minua* Sørensen, 1932 [stem: Minu-], invalid senior subjective synonym of *Minuella* Roewer, 1949 by González-Sponga (1987). † Familial nomen permanently invalid, being based on an unavailable genus nomen, published without designation of a type species after 1930 (ICZN Code Art. 13.3).

Minuinae [subfamily of Phalangodidae]: Mello-Leitão 1938: 137 (incl. *Acanthominua*, *Euminua*, *Euminuoides*, *Kalominua*, *Minua*, *Phera*); H. Soares 1966: 110 (incl. *Acanthominua*, *Euminua*, *Euminuoides*, *Kalominua*, *Minua*, *Phera*, *Pirassunungoleptes*, *Spaeleoleptes*). ‡ Apophypse (first use as subfamily).

Minuidae: Kury 2003: 211 (incl. *Acanthominua*, *Euminua*, *Euminuoides*, *Fudeci*, *Kimula*, *Metakimula*, *Microminua*, *Minua*, *Minuides*, *Pseudominua*). † Apograph (without ligature).

- Kimulidae Pérez-González, Kury and Alonso-Zarazaga in Pérez-González and Kury 2007: 207 (incl. *Acanthominua*, *Euminua*, *Euminuoides*, *Fudeci*, *Kimula*, *Metakimula*, *Microminua*, *Minuella*, *Pseudominua*, *Tegipiolus*).

Kimulidae–Pérez-González et al., 2017: 16 (incl. *Fudeci*, *Kimula*, *Metakimula*, *Minuella*, *Relictopiolus*, *Tegipiolus*).

Included genera. *Fudeci* González-Sponga, 1998, *Kimula* Goodnight and Goodnight, 1942, *Metakimula* Avram, 1973, *Minuella* Roewer, 1949, *Relictopiolus* Pérez-González, Monte and Bichuette, 2017, *Tegipiolus* Roewer, 1949 and *Usatama* gen. nov.

Usatama gen. nov.**Type species.** *Usatama infumatus* sp. nov.**Etymology.** Named after Usatama (or Uzathama), heroic chieftain of the Chibcha Sutagao people, who inhabited what is today the municipality of Sylvania. Gender masculine.**Diagnosis.** Large kimulid (3.7 mm DS) with slender and elongate leg IV in males (Fig. 1E; contrasting with *Tegipiolus*, *Relictopiolus*, *Metakimula* and *Kimula*). Differs from other genera of Kimulidae by having a small erect tubercle in ocularium (Figs. 1B, 1C; instead of large and hooked forward or backwards) and preocular mound well developed and separated from ocularium by a depression (Figs. 1C, 2A). Dorsal scutum type theta (θ) with bulge and parallel-sided coda well differentiated by a constriction marked at area III level (Figs. 1A, 2A; as in *Minuella*,contrasting with abdominal scutum flaring with exceedingly slight constriction as in *Fudeci*, *Relictopiolus*, *Tegipiolus*; no constriction whatsoever with laterals converging or parallel in *Kimula*, *Metakimula*). Without prominent spines or tubercles in mesotergum or free tergites (Fig. 1A, 2A; contrasting with free tergite III armed with stouter median spine in *Kimula*, *Metakimula* and with mesotergum and tergites provided with rows of thick protuberances in *Relictopiolus*, and also with lateral projections in FT I and/or II in *Minuella*). Free sternites without special armature (contrasting with *Kimula* and *Metakimula*). Fe IV sexually dimorphic, in male non-incrassate, but longer and less curved, armed with a few short proventral spines (Figs. 1E, 1F; as in *Minuella*, contrasting with incrassate and provided with spines in *Kimula*, *Metakimula*, *Relictopiolus*, *Tegipiolus*). Tarsal counts 4-14-4-4. Leg I with 4 tarsomeres is the

Fig. 1. *Usatama infumatus* sp. nov. A. Male holotype (MNRJ 60264), dorsal view. B. Same, lateral view. C. Same, frontal view. D. Same, ventral view. E. Same, habitus dorsal view. F. Female paratype (MNRJ 60382), habitus dorsal view. Abbreviations: Pr Mo (preocular mound); Su 1 (mesotergal sulcus I). Scale bars: 1 mm.

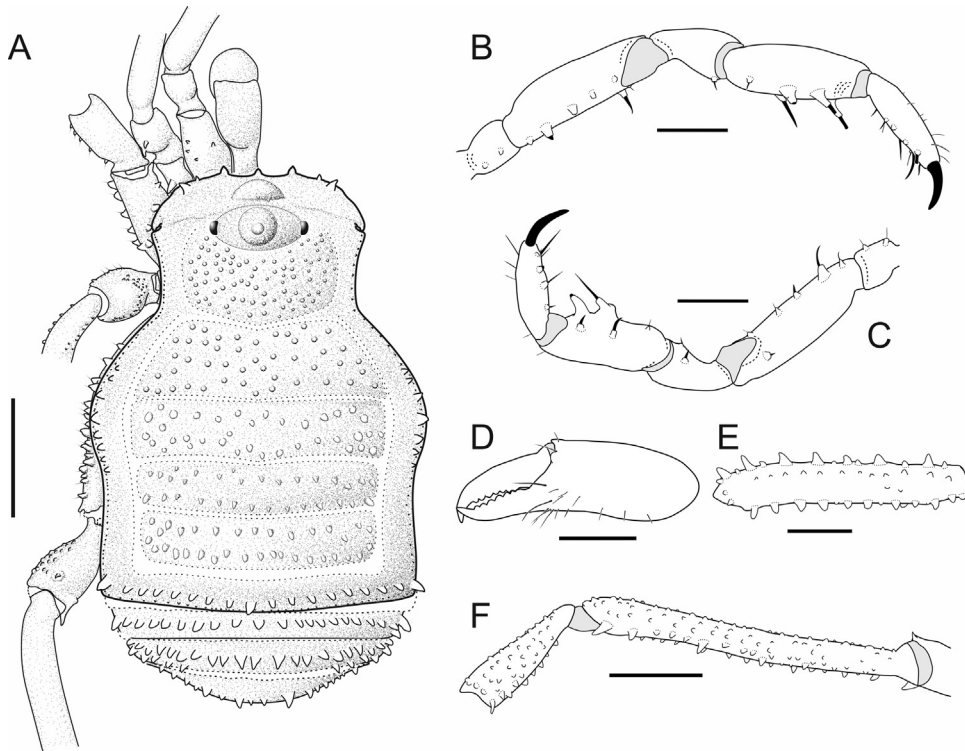


Fig. 2. *Usatama infumatus* sp. nov. (MNRJ 60264) male holotype, schematic. A. Dorsal view. B. Right pedipalp, ectal view. C. Left pedipalp, mesal view. D. Right chelicera, dorsal view. E. Left femur I, retrolateral view. F. Right femur IV, prolateral view. Scale bars: 1 mm.

rule in kimulids (only *Fudeci*, *Relictopiolus* and *Tegipiolus* have 3). Leg II with 14 tarsomeres is the maximum number in the family (most species have around 7–11, while *Fudeci*, *Relictopiolus* and *Tegipiolus* have 4–5). Leg III with 4 tarsomeres is the minimum in the family (which all have 5, except *Relictopiolus* also with 4). Leg IV with 4 tarsomeres is unique in the family (species of all other genera have 5–6). A detailed comparison of male genitalia may be found in the discussion section, herein a brief characterization of it in *Usatama* is given: Truncus polyhedral with slight and gradual thickening (Figs. 3A, 3C) with extensive striated region all around it (Fig. 3B). Groove or socket absent (Figs. 3A, 3C, 3D). Three well-marked U-flakes, which are more or less perpendicular to the main axis of truncus (Figs. 3D, 3E, 3G, 3I); distal U-flake is smaller and its tips do not meet dorsally (Fig. 3E, red area); medial U-flake is enormous, with its tips meeting dorsally, where the conductors rest (Figs. 3D, 3I, yellow area); proximal U-flake is mostly concealed under the medial one (Figs. 3D, 3E, 3G, green area). Macrosetae: one pair of short spatulate lateral MS, mostly hidden by the proximal U-flake (Fig. 3D, 3G); three pairs of short cylindrical ventral MS on the medial U-flake (Figs. 3E, 3F). Conductors moderately-sized (Figs. 3G, 3H).

Usatama infumatus sp. nov.

Type data. ♂ holotype (MNRJ 60264) and four ♀ paratypes (MNRJ 60382) from Colombia, Cundinamarca, Silvania, Condominio El Pedregal (4°23'30.07" N; 74°23'43.15" W), 1520 m. WWF Ecoregion: NT0136

(Magdalena Valley montane forests). High Andean forest, between trunks and leaf litter. 30–31.xi.2018, D. Ahumada, C. López, H. Vides and Y. Carpio leg.

Etymology. From Latin adjective *infumatus* (smoked), which is a direct translation of the Spanish surname Ahumada. From our friend and collector of the type series, Daniela Ahumada.

Description of ♂ holotype. Measurements: DSL: 3.65, CL: 1.22, CW: 1.75, AW: 2.80. Pedipalp: Tr: 0.34, Fe: 0.90, Pa: 0.56, Ti: 0.84, Ta: 0.75. Leg I: Tr: 0.46, Fe: 1.52, Pa: 0.75, Ti: 1.15, Mt: 1.66, Ta: 1.03. Leg II: Tr: 0.63, Fe: 3.27, Pa: 2.06, Ti: 2.79, Mt: 4.06, Ta: 3.17. Leg III: Tr: 0.47, Fe: 1.57, Pa: 0.66, Ti: 1.39, Mt: 1.80, Ta: 1.15. Leg IV: Tr: 0.85, Fe: 3.28, Pa: 1.39, Ti: 3.05, Mt: 3.73, Ta: 1.41.

Dorsum. Entire body granulated, scutum magnum bell-shaped (type theta) with the mesotergal areas of approximately the same width, but wider at the level of areas I–II (bulge); scutum outline with well-marked constriction at sulcus I (Figs. 1, 2A). Abdomen 1.6 times wider than carapace. Posterior margin of the scutum slightly convex. Anterior margin of carapace slightly convex with two antero-lateral tubercles each side, cheliceral sockets well-marked (Figs. 1A, 2A). Anterior region of carapace with a prominent preocular mound differentiated from the ocularium (Figs. 1B–C). Conspicuous ocularium, granulated, with an erect conical low spine (Figs. 1A–C, 2A). Mesotergum slightly convex with five unarmed areas without medial division (Figs. 1A, 1B, 2A). Lateral borders of abdomen with some tubercles in the bulge and one acuminate tubercle in the postero-lateral corners

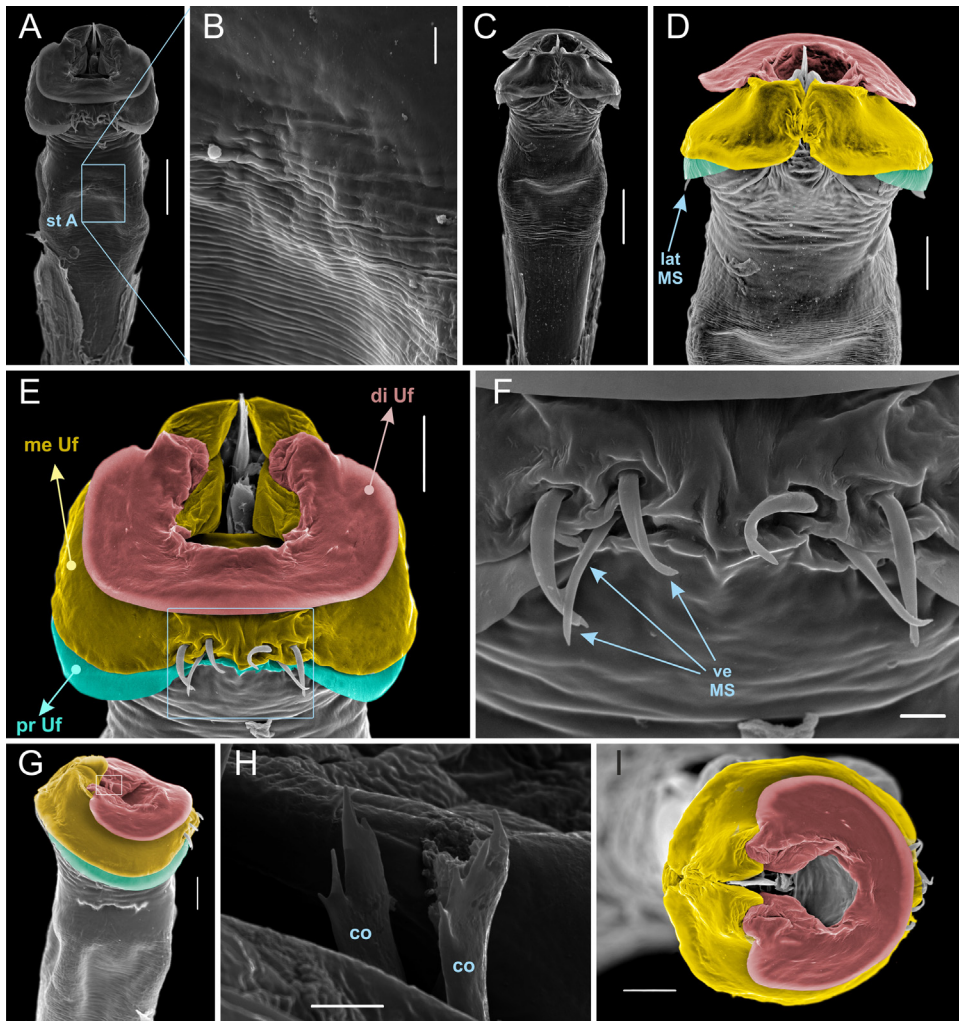


Fig. 3. *Usatama infumatus* sp. nov. (MNRJ 60264) holotype, penis. A. Ventral view, panoramic. B. Same, detail of striated area (st A). C. Dorsal view, panoramic. D. Same, distal part, ventral view. E. Distal part, ventral view. F. Same, detail of the ventral setae. G. Distal part, dextralateral view. H. Conductors (co), detail, oblique view. I. Distal part, apical view. Colored areas: distal U-flake (di Uf, red); medial U-flake (me Uf, yellow); proximal U-flake (pr Uf, green). Scale bars: 100 μm (A, C); 50 μm (D, E, G, I); 10 μm (B, F) and 5 μm (H).

(Fig. 1B); area I longer (along the anterior–posterior axis) than remaining areas. Mesotergal sulci complete and straight, except sulcus III that is medially V-shaped; area V with a transverse row of tubercles (Fig. 1A). Free tergites each with one transverse row of tubercles (Figs. 1A–B). Coxa IV scarcely visible in dorsal view (Fig. 2A).

Venter. Coxae I–IV granular. Coxae I and II remarkably procurved, III short and straight, and IV large and projected backwards. Coxae II and IV with rounded tubercles in retrolateral and prolateral regions, respectively (Figs. 1A, 1D, 2A). Coxa IV with a conical retro-lateral tubercle at posterior border (Fig. 1D). Free sternites each with a transverse row of prominent acute setiferous tubercles (Figs. 1A, 1B, 1D, 2A). Anal operculum covered by many low tubercles and spiracles oval (Fig. 1D).

Chelicera. Basichelicerite unarmed with a well-marked rounded bulla. Cheliceral hand unarmed, not swollen, with several sensilla on mesal region. Movable and fixed

finger each with seven uniform rounded teeth (Figs. 1B, 2A, 2D).

Pedipalp. Coxa short, unarmed, finely granulated. Trochanter globular, with two ventral small setiferous tubercles. Femur armed with a ventroectal row of five setiferous tubercles (the second basalmost larger than the others) and one mesodistal medium-sized setiferous tubercle. Patella cylindrical, armed with one ventroectal and one ventromesal setiferous tubercles. Tibia armed ventrally with two mesal and three ectal setiferous tubercles (the basalmost smaller than the others, the medial one raising on a protuberance). Tarsus dorsally with sparse sensilla and ventrally with four ectal and four mesal setiferous tubercles (Figs. 2B, 2C).

Legs. Legs I–IV granulate; Fe I with one dorsal row of tubercles of different sizes and two ventral rows of tubercles of equal size (Figs. 1D, 2E). Tr IV with one dorso-distal tubercle and one retrolateral distal acuminate

tubercle (Figs. 1D, 2F); Fe IV same size of DS length, with one prolateral and one retrolateral row of tubercles (the distalmost larger than the others and projected backwards); Pa IV with a distal acuminate tubercle in the prolatero-ventral face (Fig. 2F). Tarsal formula: 4(2)/14(2)/4/4.

Male genitalia (Fig. 3). Same as in genus diagnosis.

Color (in alcohol, Fig. 1). DS Dark Brown (59), sulci Deep Brown (56); coxae, trochanters, stigmatic area, chelicerae and pedipalps Dark Orange Yellow (72), Femora to tarsi I–IV Dark Brown (59) with Dark Orange Yellow (72) rings in Fe and Ti I–IV.

Female. Paratypes measurements ($n=4$, Min–Max): DSL: 3.17–3.53, CL: 1.16–1.28, CW: 1.48–1.69, AW: 2.31–2.66; Pedipalp: Tr: 0.26–0.31, Fe: 0.66–0.85, Pa: 0.44–0.51, Ti: 0.62–0.71, Ta: 0.44–0.65; Leg I: Tr: 0.33–0.40, Fe: 0.93–1.10, Pa: 0.47–0.61, Ti: 0.74–0.84, Mt: 1.10–1.13, Ta: 0.74–0.78; Leg II: Tr: 0.46–0.51, Fe: 1.51–1.75, Pa: 0.82–0.95, Ti: 1.15–1.24, Mt: 1.65–1.97, Ta: 1.61–1.73. Leg III: Tr: 0.39–0.52, Fe: 0.97–1.08, Pa: 0.46–0.53, Ti: 0.78–0.92, Mt: 1.14–1.37, Ta: 0.79–0.92. Leg IV: Tr: 0.53–0.61, Fe: 1.50–1.81, Pa: 0.79–0.88, Ti: 1.44–1.66, Mt: 2.05–2.24, Ta: 0.82–1.04.

Similar to male except for: 1) leg IV sexually dimorphic (shorter and thicker in females), 2) DS with constriction more accentuated; coda divergent (parallel in male), 3) absence of acuminate tubercles in the postero-lateral corners of DS (Figs. 1E, 1F).

Distribution. Known only from the type locality.

5. Discussion

5.1. Distribution of kimulids (Fig. 4)

All species of Kimulidae inhabit forested areas, mostly of WWF type 01, but also 02 and 03. Most species lie between the altitudinal range of 100 m and 1400 m. The species farthest from the central distribution core are those of *Tegipiolus* (from humid enclaves in xeric regions) and *Relictopiolus* (obligate cave-dweller from the Atlantic Dry Forests). There is no record of the family from the Lesser Antilles, and *Kimula*/*Metakimula* occur in the Greater Antilles in moist and dry forests and even in Pine forests in Hispaniola. The most diverse genus *Minuella* occurs only in montane forests, in two Venezuelan nuclei: the Coastal Range and the Andes (Cordillera de Mérida, where it reaches 2500 m, the maximum altitude for the family). *Fudeci* occurs only on the slope of a tepui in SE Venezuela. *Usatama* occurs on the slope of the easternmost Colombian mountain range, more or less contiguous with the Venezuelan Andes.

5.2. Comparison of male genitalia among kimulids

The male genitalia of *Fudeci curvifemur* as depicted in the original description are extremely schematic, avoiding a detailed appraisal, but apparently they strongly resemble those of *Minuella*. In most Kimulidae, the thin cylindrical

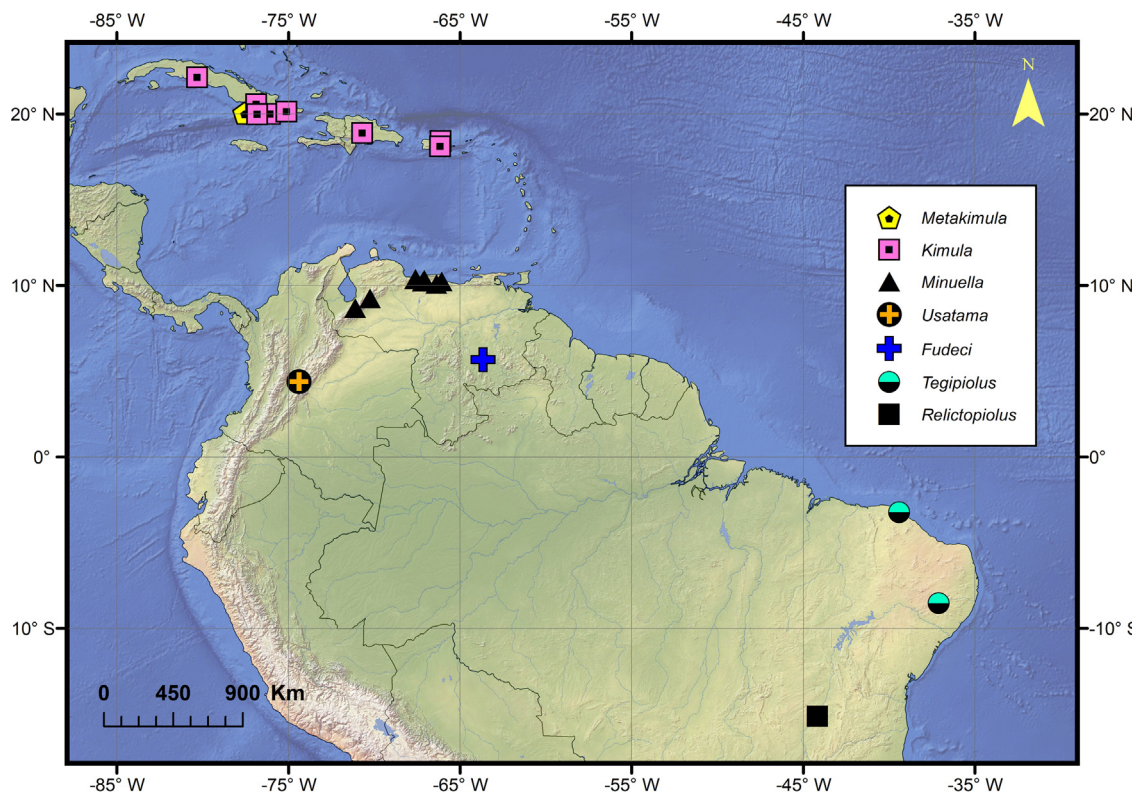


Fig. 4. Central Neotropics, showing the distribution of the genera of Kimulidae.

truncus pars basalis (PB) grows abruptly thicker distally as a deeply striated region (as in *Kimula*, *Metakimula*, *Minuella*, and *Tegipiolus*). In *Usatama*, the truncus is more polyhedral and the thickening is slight and gradual. The PB is separated from pars distalis (PD) by a deep groove in *Kimula* and *Minuella*, and PD fits into an apical socket in PB in *Tegipiolus*. A groove or socket are absent in *Usatama*. There may be two groups of macrosetae on pars distalis of kimulids: the lateral/dorso-lateral and the ventral. *Tegipiolus*: 4 pairs of huge spatulate MS arranged in an oblique row from lateral to dorsal; only 1 pair of small cylindrical ventro-lateral MS. *Minuella*: 3–4 pairs of huge tubular dorso-lateral MS arranged in a vertical row; no ventral MS. *Kimula*: 3–4 pairs of huge spatulate dorso-lateral MS arranged in a vertical row; no ventral MS. *Metakimula*: 2 pairs of short cylindrical lateral MS arranged in a slanted row; 2 pairs of similar ventral MS. *Usatama*: 1 pair of short spatulate lateral MS, mostly hidden by the proximal U-flake; 3 pairs of short cylindrical ventral MS on the medial U-flake. *Usatama* may also be separated from the other genera by possessing 3 well-marked U-flakes, which are more or less perpendicular to the main axis of the truncus; the apical U-flake is smaller and its tips do not meet dorsally, while the medial U-flake is enormous, with its tips meeting dorsally, where the conductors rest. The proximal U-flake is mostly concealed under the medial one. In other Kimulidae, the distal U-flake is much reduced and erect, the medial U-flake is much more developed than the others, while the proximal U-flake is only a lobe attached to it. *Usatama* can also be distinguished from *Tegipiolus* by the normal size of the conductors, which in *Tegipiolus* are enormously developed.

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