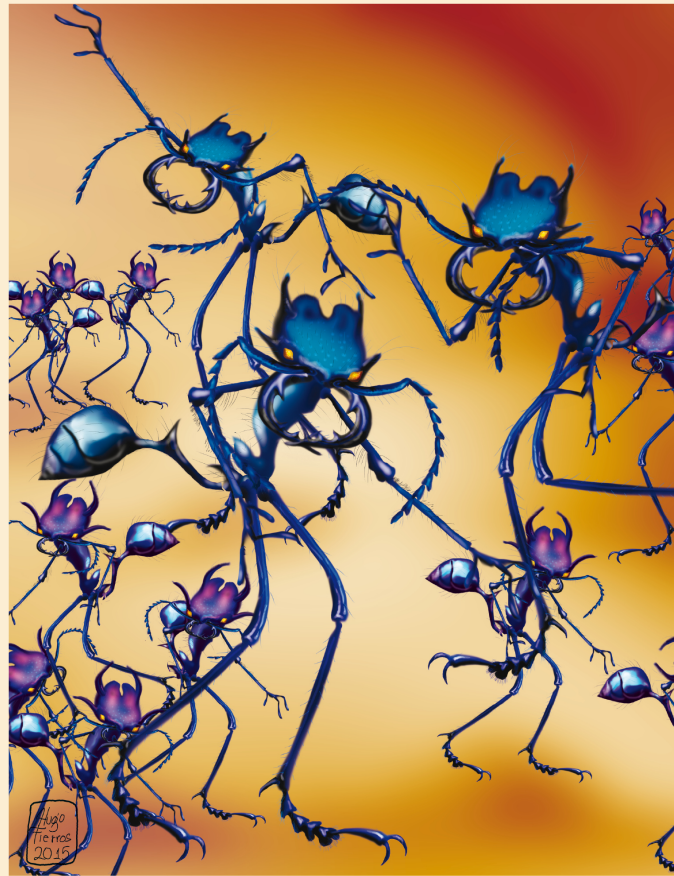


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Revision of *Moorella* Cameron, 1913 (Hymenoptera: Encyrtidae)

Revisión de *Moorella* Cameron, 1913 (Hymenoptera: Encyrtidae)

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ABSTRACT

A diagnosis of the New World encyrtid wasp genus *Moorella* Cameron, 1913, a key to females of its six species, their synopsis, and descriptions and illustrations of *M. alini* Trjapitzin and Triapitsyn sp. n. (Brazil), *M. irwini* Triapitsyn and Trjapitzin sp. n. (Brazil), and *M. zuparkoi* Triapitsyn and Trjapitzin sp. n. (Arizona, USA), are given. A new combination, *Moorella latipes* (Girault, 1913), comb. n., is established (from *Homalotylus* Mayr, 1876, originally described from Paraguay).

Key words: Hymenoptera, Encyrtidae, *Moorella*, taxonomy, key, parasitoid, Chrysopidae.

RESUMEN

Se elaboró un diagnóstico del género de las avispa Encyrtidae *Moorella* Cameron, 1913 del Nuevo Mundo, una clave de las hembras de sus seis especies, su sinopsis y las descripciones e ilustraciones de *M. alini* Trjapitzin y Triapitsyn sp. n. (Brasil), *M. irwini* Triapitsyn y Trjapitzin sp. n. (Brasil) y *M. zuparkoi* Triapitsyn y Trjapitzin sp. n. (Arizona, EE.UU.). Se establece una combinación nueva, *Moorella latipes* (Girault, 1913), comb. n. (de *Homalotylus* Mayr, 1876, descrita originalmente de Paraguay).

Palabras clave: Hymenoptera, Encyrtidae, *Moorella*, taxonomía, clave, parasitoide, Chrysopidae.

The little known New World (mostly Neotropical) encyrtid (Hymenoptera: Encyrtidae) wasp genus *Moorella* Cameron, 1913 has never been revised taxonomically. Its species are very rare in the scientific collections; reviewing *Moorella* has been therefore a challenge. Except for *M. compressiventris* (Timberlake, 1925), known from several specimens and which was nicely described and illustrated by Timberlake (1925), the remaining species, both described and undescribed ones, are represented exclusively by singletons. Moreover, the holotypes of *M. fulviceps* Cameron, 1913 (the type species of the genus) and *M. latipes* (Girault, 1913), comb. n. (from *Homalotylus* Mayr, 1876) are incomplete, lacking some body parts which are critical for their recognition, and their original descriptions are very poor, lack any illustrations, and contain obvious mistakes regarding the number of female antennal segments.

This contribution was prompted by the discovery of a female specimen of an undescribed species of *Moorella* from Brazil in the collection of the Zoological Museum of Moscow State University, Russia [ZMUM]. Other specimens examined are deposited in the following collections: The Natural History Museum, London, England, UK [BMNH], The Bernice Pauahi Bishop Museum, Honolulu, Hawaii, USA [BPBM], California Academy of Sciences, San Francisco, California, USA [CAS], Essig Museum of Entomology, University of California, Berkeley, California, USA [EMEC], Museo de La Plata, La Plata, Buenos Aires, Argentina [MLPA], Entomology Research Museum, University of California, Riverside, California, USA [UCRC], and Museum für Naturkunde, Leibniz-Institut für Evolutionsforschung, Berlin, Germany [ZMHB].

Terms used for morphological features are those of Gibson (1997). Abbreviations used in the text are: F = an antennal funicular segment; mps = multiporous plate sensillum or sensilla

on the antennal flagellar segments (= longitudinal sensillum or sensilla or sensory ridge(s) of authors).

Noyes (1980) mentioned a probably undetermined *Moorella* sp. from Panama but that specimen could not be located during the first author's visit to the BMNH in August 2014.

TAXONOMY

Genus *Moorella* Cameron, 1913

(Figs 1-18)

Moorella Cameron 1913: 124-125. Type species: *Moorella fulviceps* Cameron, 1913, by monotypy.

Chrysopophilus Timberlake 1925: 178-179. Type species: *Chrysopophilus compressiventris* Timberlake, 1925, by original designation. Synonymized under *Moorella* by Noyes 1980: 213.

Moorella Cameron: Heqvist 1961: 109 (not a Cleonyminae but an "Eupelmidae near *Metapelma* Westw.[ood]"); Noyes 1980: 213 (distribution, host association, comments).

Diagnosis. FEMALE. Body rather slender, length 1.5-2.2 mm. Head hemispherical or convex lentiform (Figs 1, 7, 9). Occipital margin sharp. Frontovortex broad. Ocelli in an equilateral or obtuse triangle. Scrobes either absent or short, not meeting above. Antenna inserted near mouth margin; scape very long, linear (Figs 3, 14, 17); pedicel considerably longer than wide; funicle 6-segmented, with F1 either small, transverse and notably shorter than F2, or more or less cylindrical (at least slightly longer than wide) and a little longer than F2; clava with a strong oblique dorsal truncation, either entire (Fig. 3) or apparently (that, however, needs confirmation) 3-segmented in *M. alini* sp. n. and also in *M. latipes*, as specified for the latter by Girault (1913) who slide-mounted the appendages of its holotype. Mandible 3-dentate, with one tooth blunt in *M. compressiventris* (Fig. 2). Palpal formula

3-3 in *M. compressiventris* (Timberlake 1925). Mesoscutum either with notaular lines complete but often rather evanescent, meeting near posterior margin of mesoscutum, or not at all evident. Axillae large, more or less broadly meeting. Wings not abbreviated. Fore wing long and narrow, with infusate area(s) (always with a central oval infusate spot or band) and a hyaline pattern (Figs 4, 10, 15, 18); marginal vein from only a little longer than wide to about 5x as long as wide; stigmal vein almost straight, oblique, enlarged apically; linea calva either interrupted posteriorly by several setae or not interrupted. Metatibia laminately expanded (distinctly flattened) (Figs 1, 6, 7, 9, 13, 16). Tarsi 5-segmented. Gaster short, strongly compressed laterally (Fig. 7). Ovipositor sheaths usually not exerted (but ovipositor markedly exerted in *M. irwini* sp. n.).

MALE. Unknown.

Distribution. Neotropical region: confirmed records from Brazil, Guyana, Panama, and Paraguay, and also southern Nearctic (a new record for the region): USA (Arizona).

Host associations. *Moorella compressiventris* was reared in Panama from a cocoon of a *Chrysopa* sp. (Neuroptera: Chrysopidae) (Timberlake 1925). We believe it is probably a primary endoparasitoid, according to the systematic position of the genus.

Systematic position. Cameron (1913) hesitated concerning the systematic position of *Moorella* and tentatively attributed it to the family Cleonymidae, now treated as subfamily Cleonyminae of Pteromalidae (Hymenoptera: Chalcidoidea). Timberlake (1925) wrote that his genus *Chrysopophilus* (now a synonym of *Moorella*) is closely related to the encyrtid genus *Isodromus* Howard, 1887 and noted that it differs from the latter by the head being hemispherically convex, the metatibia laminately expanded, and the gaster small and very strongly compressed laterally. Species of *Isodromus* are also parasitoids of Chrysopidae. Trjapitzin (1973) placed *Moorella* (as *Chrysopophilus*) in the tribe Homalotylini of the subfamily Encyrtinae; Noyes (1980) was of the same opinion.

We consider *Moorella* to be rather closer to *Homalotylus* than to *Isodromus*, based on several common features but primarily on the complete notaular lines on the mesoscutum (when evident), from which it differs mainly by two more or less reliable morphological characters of yet questionable generic value: the head being characteristically hemispherically convex and the gaster being very short, strongly compressed laterally. All species of *Moorella* have a strongly flattened (laminately expanded) metatibia, but as we know from other encyrtid genera with a similar feature, such as *Neocladia* Perkins, 1906, the degree of flatness may not be always considered a good generic-level character (Trjapitzin and Triapitsyn 2010), although it is indeed very useful for the recognition of *Moorella* species. Indeed, in *Homalotylus shuvakhinae* Trjapitzin and Triapitsyn, 2004 from Mexico (Trjapitzin and Triapitsyn 2004), the metatibia is rather wide yet not as flattened and laminately expanded as in *Moorella*. However, at this point we would prefer to abstain from making any nomenclatural decisions about a possible congeneric status for *Moorella* and *Homalotylus*, of which the former could very well be just a mere derived species group, at least until a rigorous phylogenetic study of the Homalotylini and supporting molecular data become available. For the time being at least,

after all, *Moorella* is easily recognizable and thus is better to be considered a valid genus. Because female antennae (which are of diagnostic importance in *Moorella*) of the two out of three earlier described taxa are lost, and their original descriptions are poor and contain mistakes (Cameron 1913; Girault 1913), color of body and appendages is very useful for separation of species in this genus.

Key to species of *Moorella* (females)

- 1 General body color black (Fig. 1); fore wing with marginal vein long, about 5x as long as wide. [Body length 2.2 mm] *M. alini* Trjapitzin and Triapitsyn, sp. n.
- General body color not black; fore wing with marginal vein short, at most 3x as long as wide 2
- 2(1) General body color very dark metallic purple, mesoscutum and gaster with a bluish luster. [Body length 1.5 mm] *M. latipes* (Girault, 1913), comb. n.
- General body color not as above 3
- 3(2) Metabasitarsus almost entirely dark brown (except whitish apically, Figs 6-9) 4
- Metabasitarsus almost entirely white (except brownish basally, Figs 13, 16) 5
- 4(3) Head yellowish-brown; fore wing (Fig. 10) 2.75x as long as wide. [Body length 1.5 mm] .. *M. fulviceps* Cameron, 1913
- Head greyish-brownish (in the paratype) or brownish (Fig. 7); fore wing (Fig. 4) 3.05x as long as wide. [Body length 2.03-2.06 mm] *M. compressiventris* (Timberlake, 1925)
- 5(3) Head orange, base of gaster whitish-yellowish (Fig. 16). [Body length 1.98 mm] *M. zuparkoi* Triapitsyn and Trjapitzin, sp. n.
- Head mostly brown with lower part of frontovertex light brown, base of gaster brown (Fig. 13). [Body length 1.82 mm] *M. irwini* Triapitsyn and Trjapitzin, sp. n.

Alphabetical synopsis of the species

Moorella alini Trjapitzin and Triapitsyn, sp. n.

(Fig. 1)

Type material. Holotype female [ZMUM], on point (labeled in Russian): BRAZIL, São Paulo, Parelheiros, 7.ii.1977, V. Alin.

Description. FEMALE (Fig. 1). Body length 2.2 mm. Head (in lateral view) convex, lentiform, 1.8x as high as long and 1.4x as wide as high. Occipital margin slightly convex, posterior margin of eye reaching or almost reaching it. Frontovertex gradually narrowing anteriorly, about 0.4x maximum head width at the level of anterior ocellus. Ocelli small, forming an obtuse triangle; distance between posterior ocelli about 1.5x more than distance from posterior to anterior ocelli; distance from posterior ocellus to eye margin 1.5x and to occipital margin 4x more than diameter of an ocellus. Scrobes present but very short, not meeting above, their inner margin almost parallel. Interantennal prominence almost flat in its upper part, but moderately convex in its lower part, reaching mouth margin. Toruli immediately under the level of lower eye margin and rather close to mouth margin; distance between toruli more than distance from them to eye margin (11:7) and than that to mouth margin (11:4). Gena with sharp margin. Greatest diameter of eye 2.3x more than malar space length. Subocular suture absent. Width of oral orifice about 0.5x head width; mouth margin

concave. Scape about 8x as long as wide and approximately 2.7x longer than pedicel, the latter 3x as long as wide at apex and 4x longer than a small, transverse F1; F2 about 2x as long as F1 and 1.5x as long as wide; F3 a little shorter (5:6) and wider than F2; F4 quadrate, as long as F3; F5 slightly longer than F4 and its own width; F6 slightly transverse and somewhat shorter than F5; clava apparently 3-segmented (it is difficult to be sure without having an antenna cleared and slide-mounted), as long as 3 preceding funicular segments combined, truncation of clava as long as 2/3 of clava length and 3x longer than its ventral side. Pronotum a little narrower than head (4:5), transverse, about 4x as wide as long, with a concave posterior margin. Mesoscutum a little wider than long (4:3) and 3x as long as dorsal part of pronotum. Axilla large, with convex posterior margin. Tegula large, its length only somewhat less than that of mesoscutum. Scutellum convex, a little longer than wide. Mesopleuron approximately 2x as long as high. Metapleura as two rather large, separated triangular sclerites. Fore wing long and narrow, 3.4x as long as wide, strongly surpassing apex of gaster; costal cell about 10x as long as wide, with slightly convex anterior margin; submarginal vein thin, mostly straight but slightly curved and broadened in its apical third on infuscate part of the wing, extending to about half wing length; marginal vein about 5x as long as wide and longer than stigmal vein (3:2), the latter thin, straight, with a broadened apex and an uncus; the angle between stigmal vein and anterior margin of wing about 30°; postmarginal vein not longer than stigmal vein. Metanotum as two divided large sclerites, these and sides of propodeum separate mesopleura from the base of gaster. Mesobasitarsus very long, as long as all other mesotarsomeres combined; mesotibial spur only a little shorter. Metatibia about 5x as long as its greatest width at apex; metatarsus very long, as long as 2/3 of metatibia length; metabasitarsus broad and long, 2.7x as long as wide. Propodeum inclined posteriorly in the middle, its central part separated from lateral parts by distinct submedian sulci. Gaster about 2x as short as mesosoma; first gastral (=third abdominal) tergite about 4/9 of entire length of gaster; apical part of gaster, beyond the first tergite, conical (in dorsal view), with straight or almost straight lateral margins converging posteriorly under a somewhat less than 90° angle; apex of ninth syntergite transversally truncate, slightly concave; distance from pygostyles to apex of gaster about half of its length. Hypopygium (=seventh gastral sternite) not extending to apex of gaster.

Body black, including antennae, palpi, and legs, but 2/5 of profemur apically, protibia and protarsus more or less brownish; apices of mesotibia, mesotibial spur and mesotarsus blackish brown; apical segment of pro- and meso- tarsi dark. Mesoscutum and scutellum with a greenish blue or bluish-green luster. Basal 3/8 of fore wing hyaline, followed by broad transverse fuscous band occupying about 1/3 of wing length and extending to its posterior margin; infuscate apical part of wing occupies about 1/4 wing length and separated from the fuscous central part by a transverse hyaline band (approximately 1/8 length of wing).

Frontovortex, axillae, tegulae, and triangular sclerites of metanotum with minute cellular sculpture; mesopleura with somewhat larger sculpture cells; sculpture of mesoscutum and scutellum with larger cells.

Dorsum of mesosoma with sparse black hairs. Linea calva on fore wing disc narrow, about 10x as long as wide in the middle, its margins without filum spinosum and linea bifida, as defined by Hoffer (1970) (also see Trjapitzin 1989; Trjapitzin and Ruíz Cancino 2000; Trjapitzin et al. 2008); linea calva closed posteriorly only by 2 or 3 setae; fuscous or infuscate areas of fore wing disc with black setae. Metacoxa with rather long white hairs. Sides of pronotum with dense silvery pubescence.

MALE. Unknown.

Diagnosis. Besides the distinctive body color, *M. alini* has a very short, transverse F1 of the female antenna. It differs from *M. latipes*, which also may have this feature (that, however, needs to be confirmed), in having a much longer marginal vein of the fore wing, as indicated in the key.

Etymology. The new species is named after its collector, an amateur expatriate Russian entomologist Vasilij Nikolayevich Alin, who donated to ZMUM many interesting insect specimens he had collected in Brazil.

Host(s). Unknown.

Moorella compressiventris (Timberlake, 1925)

(Figs 2-7)

Chrysophilus compressiventris Timberlake 1925: 179-180, Plate IX. Holotype female [BPBM] (not examined). Type locality: an unknown locality in the former Canal Zone, Panama.

Moorella compressiventris (Timberlake): Noyes 1980: 213.

Type material examined. Paratype female [UCRC], on point labeled (in P.H. Timberlake's handwriting): 1. "Ex chrysopid cocoon"; 2. "Canal Zone Panama"; 3. "Fullaway Coll. Mar. 1924"; 4. [yellow, printed] "Paratype"; 5. "*Chrysophilus compressiventris* Timb. Paratype". Mouthparts with a mandible dissected (Fig. 2), an antenna (Fig. 3), a fore wing (Fig. 4), a hind wing (Fig. 5), and a hind leg (Fig. 6) from this paratype specimen are mounted under separate coverslip fragments on two slides [UCRC], labeled: 1. "*Chrysophilus compressiventris* Timb. ♀ antenna, wings [on one slide or "♀ mouthparts and hind leg." on the other slide], Ex *Chrysopa* cocoon Canal Zone, Panama Mar. 1924 Fullaway, Coll."; 2. "*Moorella compressiventris* (Timberlake) Det. S.V. Triapitsyn Oct. 1998 from PARATYPE ♀".

Material examined. BRAZIL, Minas Gerais, Lavras, 3.iv.1974, J.C. Souza [2 females, MLPA].

Distribution. Brazil (De Santis 1989) and Panama (Timberlake 1925).

Host. Reared in Panama by D.T. Fullaway from a cocoon of *Chrysopa* sp. (Neuroptera: Chrysopidae) (Timberlake 1925).

Comment. The specimens from Brazil, of which one female is illustrated (Fig. 7), were undoubtedly correctly identified as such by L. De Santis.

According to the original description, the holotype of *Chrysophilus compressiventris* had been deposited in the collection of the Hawaiian Sugar Planters' Experiment Station (Timberlake 1925) but currently it is in the BPBM, databased there under BPBM-entTyp5721.

Moorella fulviceps Cameron, 1913

(Figs 8-10)

Moorella fulviceps Cameron 1913: 125. Type locality: an unspecified locality in Guyana.

Moorella fulviceps Cameron: Noyes 1980: 131 (illustration of metatibia and metatarsus), 213 (list).

Type material examined. Holotype female [BMNH] on point labeled: 1. [red circle] "Type", 2. "P. Cameron Coll B. M. 1914-110", 3. [on the bottom of label] "3291"; 4. "*Moorella fulviceps* Cam. Type on [?Gicicmaco – illegible]", 5. "B. M. TYPE Hym. 5.1,119". The holotype (Figs 8, 9) is incomplete: lacking are flagellum of one antenna and flagellum plus pedicel of the other antenna, all the wings [except for one fore wing (Fig. 10) that is glued separately on the same point], and some legs and leg segments.

Distribution. Guyana (Cameron 1913). The record of this species from Minas Gerais, Brazil, by De Santis (1983) is incorrect (De Santis 1989).

Host(s). Unknown.

Comments. The head and pronotum are yellowish-brown, rest of the body is brown except for the base of gaster, which is whitish-yellowish. The scape and pedicel are yellowish. The metafemur and metatibia are dark brown; the metabasitarsus is almost entirely dark brown (except whitish apically), other metatarsomeres are whitish except the apical one. The occipital margin is very sharp. The fore wing of *M. fulviceps* (Fig. 10) has a filum spinosum, apparently made up of around 5 pegs. It is really difficult to be sure of the number, or even if there is more than one row. The hypopygium extends about to the apex of the gaster. It is difficult though to know if it extends exactly to the apex or not quite or just past it because of the distortion of the gaster – there is quite a (vertical) distance between the apex of the hypopygium and the apex of the last tergite (John S. Noyes, personal communication). Cameron (1913) incorrectly indicated in the generic diagnosis that the female antenna of *Moorella* is 13-segmented. Unfortunately, no other details about the antenna of the holotype of *M. fulviceps* were provided in the original description, and that has made recognition of this species and its inclusion in the key quite challenging.

Moorella irwini Triapitsyn and Trjapitzin, sp. n.

(Figs 13-15)

Type material. Holotype female [CAS], on point labeled: 1. "BRAZIL, São Paulo, Estação Biológica de Boracéia, 850 meters, II-27-1967, M.E. Irwin"; 2. "*Moorella* Det. R.L. Zuparko 1995"; 3. [database label] "CASENT 2212475". An antenna (Fig. 14) and a pair of wings (Fig. 15) from the holotype were detached and mounted at UCRC on a slide in Canada balsam (under different coverslips) and labeled with the same data. The type locality (in Salesópolis Municipality) is Estação Biológica de Boracéia, administrated by Museu de Zoologia of Universidade de São Paulo.

Description. FEMALE (Fig. 13). Body length 1.82 mm. Head (in lateral view) hemispherical, about 1.8x as high as long and about 1.6x as high as wide. Occipital margin sharp, posterior margin of eye almost reaching it. Frontoververtex with almost parallel margins, 0.36x maximum head width at the level of

anterior ocellus. Ocelli small, forming a slightly obtuse triangle; distance between posterior ocelli about 1.5x more than distance from posterior to anterior ocelli; distance from posterior ocellus to eye margin at most 0.5x and to occipital margin almost 4x more than diameter of an ocellus. Scrobes present but very short, not meeting above. Interantennal prominence small, reaching mouth margin. Toruli below the level of lower eye margin and very close to mouth margin; distance between toruli slightly more than distance from them to eye margin. Gena with sharp margin. Subocular suture absent. Width of oral orifice a little less than 0.5x head width; mouth margin concave. Antenna (Fig. 14) with radicle 2.5x as long as wide, rest of scape 7.1x as long as wide and 3.1x longer than pedicel, the latter 2.4x as long as wide at apex and 1.9x longer than a cylindrical (1.6x as long as wide) F1; F2 about as long as F3, both subquadrate and shorter than F1; F4-F6 slightly wider than long (F5 slightly longer than F3 or F4) and a little wider than preceding segments; F6 transverse and shorter than F5; clava entire, 2.5x as long as wide, as long as combined length of F3-F6 plus half length of F2, truncation as long as 0.57x of clava length; very short mps on F4 (1), F5 (4), F6 (4) and clava (at least 14). Pronotum about as wide as head, transverse, about 2.8x as wide as long, with a concave posterior margin. Mesoscutum a little wider than long, with notaular lines complete, meeting near but at some distance from posterior margin of mesoscutum, somewhat evanescent yet clearly visible at high magnification. Axilla large, with a slightly convex posterior margin. Tegula large but its length notably less than that of mesoscutum. Scutellum convex, a little longer than wide. Mesopleuron approximately 2x as long as high. Fore wing (Fig. 15) 1.44 mm long and narrow, about 2.9x as long as wide; costal cell almost 10x as long as wide, with a slightly convex anterior margin; submarginal vein thin, mostly straight but slightly curved and broadened in its apical third on infuscate part of the wing, extending to about 0.4x wing length; marginal vein about 3x as long as wide and shorter than stigmal vein (5:11), the latter thin, almost straight, with a broadened apex and an uncus; postmarginal vein a little shorter than stigmal vein; marginal setae short, the longest seta about 0.09x greatest wing width. Hind wing (Fig. 15) 4.2x as long as wide, the longest seta about 0.27x greatest wing width. Metanotum as two divided sclerites. Mesobasitarsus very long, about as long as all other mesotarsomeres combined; mesotibial spur only a little longer. Metatibia 4.2x as long as its greatest width; metatarsus a little more than 1/2 of metatibia length; metabasitarsus rather small and narrow, about 4x as long as wide. Propodeum with distinct submedian sulci. Gaster about 1.7x as short as mesosoma. Hypopygium extending to about apex of gaster. Ovipositor notably exerted beyond apex of gaster (by about the length of mesotibial spur).

Body and appendages mostly brown except lower part of frontoververtex light brown, protibia and mesotibia apically, mesotibial spur, and pro- and mesotarsi light brown, metacoxa white except brownish apically, metafemur and metatibia dark brown, metabasitarsus mostly white except basally, and remainder of metatarsomeres white except the apical segment. Fore wing (Fig. 15) almost entirely infuscate, with more or less hyaline (yet at least slightly infumate) areas and a distinct, broad transverse fuscous band. Hind wing disc mostly hyaline except its apex

(beyond venation) with a faint infumation.

Frontovortex with punctate-reticulate sculpture, scape with a faint reticulate sculpture, metanotum and mesopleuron with minute punctate sculpture.

Dorsum of mesosoma with sparse fair hairs. Linea calva on fore wing disc broad, not interrupted posteriorly; filum spinosum present and consisting of 11 pegs arranged in 2 rows; fuscous or infusate areas of fore wing disc with black setae. Metacoxa with dense white hairs. Sides of propodeum with dense silvery pubescence.

MALE. Unknown.

Diagnosis. *Moorella irwini* is somewhat similar to both *M. compressiventris* and *M. zuparkoi* sp. n. from which it differs in having a brown general body color (Fig. 13).

Etymology. The new species is named after its collector, Michael E. Irwin, currently of Vail, Arizona, USA.

Host(s). Unknown.

Moorella latipes (Girault, 1913), comb. n.
(Figs 11, 12)

Homalotylus latipes Girault 1913: 69. Holotype female [ZMHB] (not examined). Type locality: San Bernardino, Paraguay.

Homalotylus latipes Girault: Noyes 1980: 203 (list).

Distribution. Paraguay (Girault 1913).

Host(s). Unknown.

Comments. This species has a foliaceously expanded metatibia and a very short, depressed gaster (Girault 1913) and thus almost certainly rather belongs to *Moorella*. According to Viola Richter (personal communication), who kindly provided us with photographs of the labels (Fig. 11) and the remains (Fig. 12) of its holotype female (only a white metacoxa glued to a card, probably remounted from a minuten pin mentioned in the original description). The ZMHB slide No. 1021 “with head and appendages, including several legs and a fore wing”, as specified by Girault (1913, p. 69), is unfortunately lost (V. Richter, personal communication). Girault (1913) apparently miscounted the number of antennal segments in this species (the antenna should be 11-segmented if the clava is indeed 3-segmented, as specified in the original description), indicating that the female antenna is “12-jointed” – he likely mentioned a very short, transverse F1 as “a very short ring-joint” and also probably erroneously counted the radicle as an antennal segment. The “23.6. -” on the blue (data) label is most likely the collecting date (23 June, without indicating a year) of K. Fiebrig (code S is for collector, and V for seller); Karl August Gustav Fiebrig was a botanist and zoologist who collected in South America (particularly in Bolivia and Paraguay) and sold a lot of insects to the ZMHB in the early 20th Century.

To confirm the true identity of *M. latipes*, it needs to be re-collected in or near its type locality and then thoroughly redescribed and illustrated.

Moorella zuparkoi Triapitsyn and Trjapitzin, sp. n.
(Figs 16-18)

Type material. Holotype female [EMEC], on point labeled: 1. “Mt. Lemon [sic], Ar. Alt. 9000 ft. 9-5-1939 R. H. Crandall”; 2. “*Moorella?* R.L. Zuparko 1995”; 3. “?*Moorella compressiventris*

Det. R.L. Zuparko 2003”; 4. “*Homalotylus* Det. R.L. Zuparko 2004”; 5. [database label] “U.C. Berkeley EMEC 83,253”. The holotype lacks flagellum of one antenna. The other, complete antenna (Fig. 17) and a pair of wings were detached from the holotype and mounted at UCRC on a slide in Canada balsam (under different coverslips) and labeled with the same but corrected locality data. The holotype was collected on 5.ix.1939; the type locality is at a high elevation on Mount Lemmon (in Coronado National Forest, Santa Catalina Mountains, Pima Co., Arizona, USA), one of southern Arizona’s “sky islands” which have elements of the Neotropical fauna.

Description. FEMALE (Fig. 16). Body length 1.98 mm. Head (in lateral view) hemispherical, 1.85x as high as long and about 1.2x as high as wide. Posterior margin of eye not reaching occipital margin. Frontovortex with almost parallel margins, 0.36x maximum head width at the level of anterior ocellus. Ocelli small, forming a slightly obtuse triangle; distance between posterior ocelli about 1.3x more than distance from posterior to anterior ocelli; distance from posterior ocellus to eye margin about 0.5x and to occipital margin about 3x more than diameter of an ocellus. Scrobes hardly evident. Interantennal prominence small, reaching mouth margin. Toruli significantly below the level of lower eye margin (at mouth margin); distance between toruli less than distance from them to eye margin. Gena with sharp margin. Subocular suture absent. Width of oral orifice about 0.5x head width; mouth margin concave. Antenna (Fig. 17) with scape (minus short radicle) 7.0x as long as wide and 3.3x longer than pedicel, the latter 2.3x as long as wide at apex and 2.2x longer than F1; F1 1.2x as long as wide; F2 about as long as F3, both subquadrate and a little shorter than F1; F4-F6 wider than long and wider than preceding segments; clava entire, 2.5x as long as wide, as long as combined length of F3-F6 plus half length of F2, truncation as long as 0.6x of clava length; very short mps on F4 (2), F5 (4), F6 (5) and clava (at least 13). Pronotum a little narrower than head, transverse, about 1.8x as wide as long, with a concave posterior margin. Mesoscutum wider than long, with notaular lines evanescent but complete, meeting near but at some distance from posterior margin of mesoscutum. Axilla large, with an almost straight posterior margin. Tegula large but its length notably less than that of mesoscutum. Scutellum convex, a little wider than long. Mesopleuron approximately 2x as long as high. Fore wing (Fig. 18) long (2.12 mm) and narrow, about 2.7x as long as wide; costal cell 11.6x as long as wide, with slightly convex anterior margin; submarginal vein thin, mostly straight but slightly curved and broadened in its apical third or so, extending to about 0.4x wing length; marginal vein about 2x as long as wide and shorter than stigmal vein (2:5), the latter thin, slightly curved, with a broadened apex and an uncus; postmarginal vein a little shorter than stigmal vein; marginal setae short, the longest seta about 0.06x greatest wing width. Metanotum as two divided large sclerites. Mesobasitarsus very long, just slightly shorter than all other mesotarsomeres combined; mesotibial spur only a little longer. Metatibia about 4.7x as long as its greatest width; metatarsus about 1/2 of metatibia length; metabasitarsus 3.5x as long as wide. Propodeum with distinct submedian sulci. Gaster about 1.4x as short as mesosoma. Ovipositor not exerted beyond apex of gaster.

Head and mesosoma mostly orange except mesoscutum, axillae, tegulae, most of scutellum, and mesopleura orange-brown, posterior part of pronotum, apex of scutellum, metanotum and propodeum brown; gaster mostly dark brown except its base whitish-yellowish; legs mostly orange-brown except metafemur and metatibia partially brown, metabasitarsus mostly white except basally, and remainder of metatarsomeres whitish except the apical segment. Fore wing (Fig. 18) almost entirely, at least faintly infuscate, with more or less hyaline areas (particularly at base) and a distinct, broad transverse fuscous band. Hind wing disc hyaline.

Frontovertex with punctate-reticulate sculpture, scape with a faint reticulate sculpture, metanotum and mesopleuron with minute punctate sculpture.

Dorsum of mesosoma with sparse fair hairs but some of those on mesoscutum and scutellum black. Linea calva on fore wing disc rather narrow than broad, not interrupted posteriorly; filum spinosum present and consisting of 11 pegs arranged in 2 rows; fuscous or infuscate areas of fore wing disc with black setae. Metacoxa with dense white hairs. Sides of propodeum with dense silvery pubescence.

MALE. Unknown.

Diagnosis. This new species fits the above generic diagnosis of *Moorella* quite well. *Moorella zuparkoi* is somewhat similar to *M. compressiventris*, yet clearly different from the latter, which has a greyish-brownish or brownish frontovertex and an almost dark brown mesobasitarsus, in having an orange frontovertex and an almost entirely whitish metabasitarsus. In addition to the distinguishing characters indicated in the key, *M. zuparkoi* differs from *M. irwini* sp. n. by F1 being 1.2x as long as wide whereas it is 1.6x as long as wide in the latter species.

Etymology. The new species is named after Robert L. Zuparko (CAS and EMEC) who first recognized it as being probably a *Moorella* sp.

Host(s). Unknown.

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Figure 1. *Moorella alini*, female (holotype): habitus (lateral view). Figures 2-6. *Moorella compressiventris*, female (paratype): 2. Mandible. 3. Antenna. 4. Fore wing. 5. Hind wing. 6. Metatibia and metatarsus. Figure 7. *Moorella compressiventris*, female (Lavras, Minas Gerais, Brazil): habitus (dorsolateral view). Figures 8-10. *Moorella fulviceps*, female (holotype): 8. Habitus (dorsal view). 9. Habitus (lateral view). 10. Fore wing. Figures 11, 12. *Moorella latipes*, female (holotype): 11. Labels. 12. Metacoxa.



Figures 13-15. *Moorella irwini*, female (holotype): 13. Habitus (dorsal view). 14. Antenna. 15. A pair of wings (a part of the second hind wing is stuck to the fore wing). Figures 16-18. *Moorella zuparkoi*, female (holotype): 16. Habitus (dorsal view). 17. Antenna. 18. Fore wing (apex of a hind wing is stuck to it).