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New Genus and Species of Physoderinae (Heteroptera: Reduviidae) from the New World, with a Revised Diagnosis of Physoderinae Miller

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ABSTRACT

A new genus and species from Ecuador of Physoderinae (Heteroptera: Reduviidae), *Leptophysoderes orellana* n.gen., n.sp., are described. *Leptophysoderes* represents one of the two New World genera now known in this group of otherwise Pacific, Indopacific, and Madagascan Reduviidae. The initial diagnosis of Physoderinae was based on the Pacific and Indopacific genus *Physoderes* Westwood. This diagnosis was not adjusted after the subsequent inclusion of 11 genera from Madagascar and the Neotropical genus *Cryptophysoderes* Wygodzinsky and Maldonado in Physoderinae. The diagnosis is here modified to characterize a more inclusive Physoderinae, comprising *Cryptophysoderes*, *Leptophysoderes*, *Physoderes*, and the Madagascan genera.

INTRODUCTION

Physoderinae are a small group of cryptic Reduviidae that show an interesting distribution. Apart from the species-rich genus *Physoderes* Westwood, 1846, with Pacific and southeast Asian distribution, 11 genera are known from Madagascar and *Cryptophysoderes* Wygodzinsky and Maldonado, 1972, from Panama (Maldonado, 1990). The monotypic *Harpinoderes* Martínez and Carcavallo, 1989, from Argentina was subsequently described in Physoderinae.

Miller (1954) created the subfamily for *Physoderes* Westwood and based its diagnosis primarily on wing venation, spines on the femora and absence of a fossula spongiosa. Some of Villiers' (1962) nine new genera from Madagascar diverged from this original diagnosis of Physoderinae, but Villiers did not modify the concept of the group. Wygodzinsky and Maldonado (1972) described with *Cryptophysoderes fairchildi* from Panama the first genus and species from the New World, also without adapting the initial diagnosis. Martínez and Carcavallo (1989) included their new genus and species *Harpinoderes cicheroi* from Argentina in Physoderinae, but did not provide arguments for this systematic decision. Forero and Weirauch (2005) recently synonymized *H. cicheroi* with *Aradomorpha crassipes* Champion, 1899, in

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the subfamily Reduviinae, and thus removed *Harpinoderes* from Physoderinae.

The discovery of a male reduviid from Ecuador in the National Museum of Natural History, Washington, D.C., which agrees in many characters with other Physoderinae, but is distinct from all previously described genera, initiated the creation of a new genus and species to accommodate this specimen. Since Physoderinae were never diagnosed after the addition of genera from Madagascar and the New World, a revised diagnosis of Physoderinae is provided in this paper. The diagnosis of Physoderinae presented here is based on examination of the holotypes of species of all Madagascan genera (Muséum National d'Histoire Naturelle, Paris), the holotype of *Cryptophysoderes fairchildi*, and undetermined specimens of *Physoderes* spp. from India (American Museum of Natural History).

The nomenclature of the wing venation follows Davis (1961). The dorsal habitus photograph was taken with a Microptics-USA system; drawings were made using camera lucida equipment on a Nikon SMZ 1500 microscope. Black arrows in the illustrations mark diagnostic characters for *Leptophysoderes*, white arrows diagnostic characters for Physoderinae.

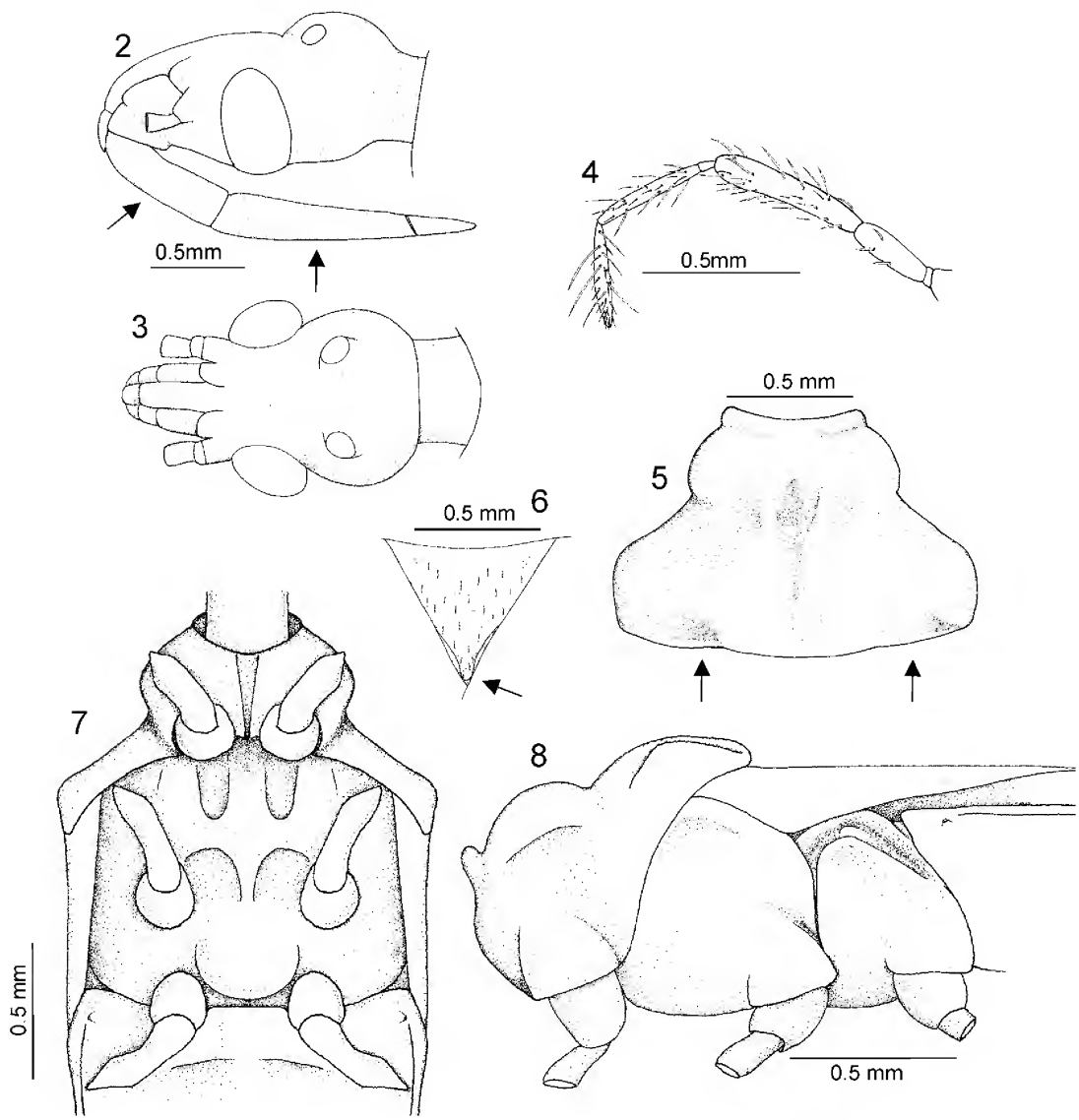
Fig. 1. Habitus photograph of *Leptophysoderes orellana*, holotype, male, in dorsal view.

Leptophysoderes, new genus
Figures 1–20

TYPE SPECIES: *Leptophysoderes orellana*, new species.

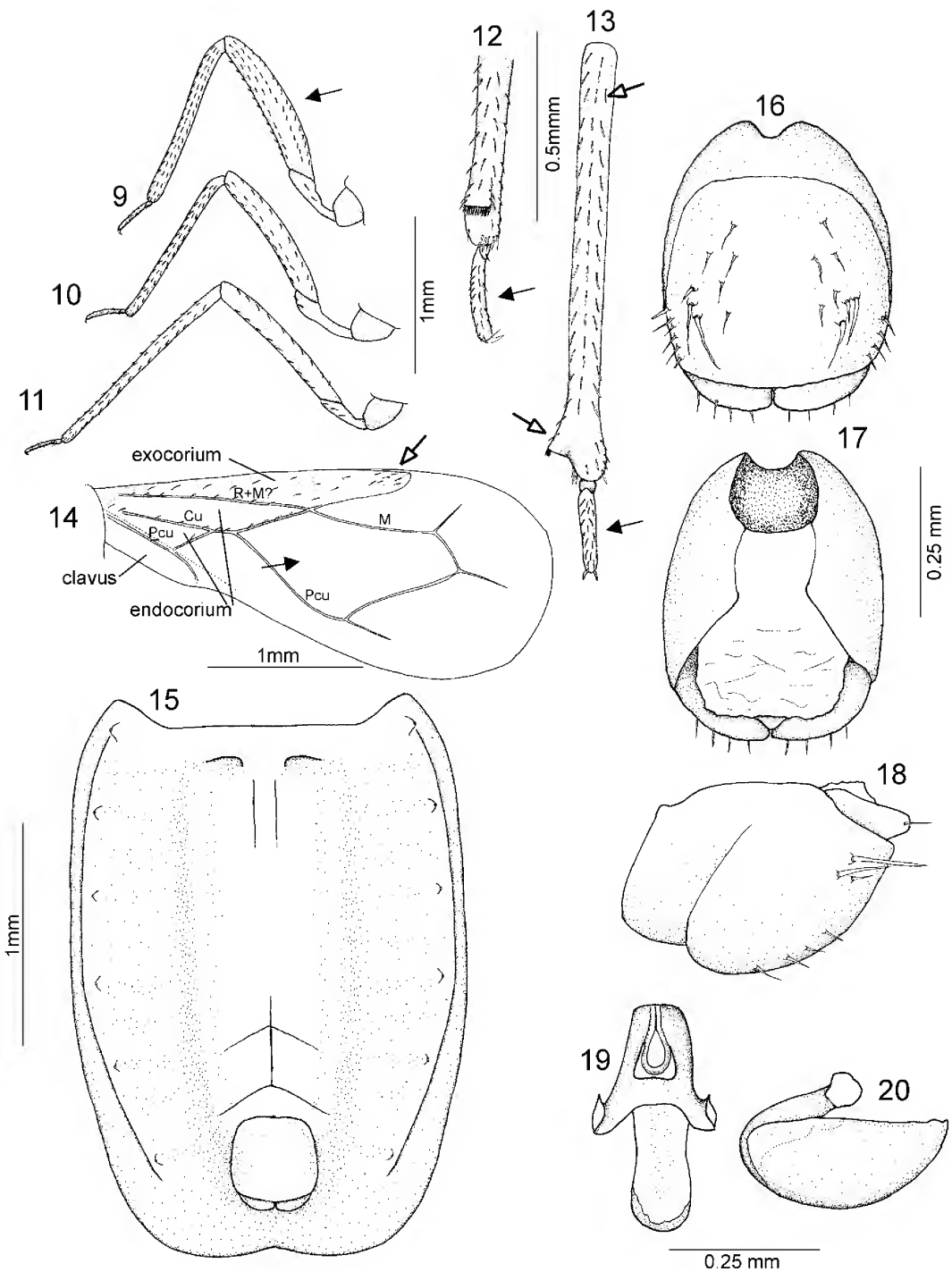
DIAGNOSIS: Recognized among other genera of Physoderinae by the small size and slender habitus (fig. 1), long second (visible) labial segment and relatively stout third labial segment (fig. 2), absence of paramedian lobe-like extensions on the posterior margin of the posterior pronotal lobe (fig. 5), slender and dorsally rounded apex of the scutellum (fig. 6), slender fore femora without ventral spines (fig. 9), all tarsi with only two tarsomeres (figs. 12, 13), and cubital vein in the membrane of the fore wing absent (fig. 14). Distinguished from the only other Physoderinae known from the Neotropical Region, *Cryptophysoderes* Wygodzinsky and Maldonado, by the longer second (visible) labial segment and the stout third (visible) segment, the absence of lobe-like extensions on the posterior margin of the posterior pronotal lobe, the slender and rounded scutellar apex, the very slender fore femora without spines, and the wing venation with the cubital vein in the membrane absent.

DESCRIPTION: *Male*: Small (4.58 mm), macropterous, thorax and abdomen elongate rectangular, pronotum narrow, head slender and elongate. **Vestiture**: Body and corium sparsely covered with semi-adpressed, slightly widened setae (figs. 1, 6), legs with semi-erect, rather stout setae on small tubercles (figs. 9–11), lateral rim of connexiva, especially on segment 7 with long, stout setae on tubercles



Figs. 2–8. Head and thorax of *Leptophysoderes orellana*, holotype, male. **2**. Head, lateral view. **3**. Head, dorsal view. **4**. Left antenna, lateral view. **5**. Pronotum, dorsal view. **6**. Scutellum, dorsal view. **7**. Thorax, ventral view. **8**. Thorax, lateral view.

(fig. 1). **Head** (figs. 2, 3): Head about 2/3 as long as pronotum, anteocular portion about as long as posterior (measured to anterior margin of neck), almost as wide as greatest width of eyes, well-developed interocular sulcus posterior to posterior margin of eye, mandibular and maxillary plates short, portion of gena adjacent to labium distinctly separated from remaining gena, gula with longitudinal groove on anteocular portion, clypeus slender, anterior portion slightly elevated, labrum elongate triangular, slender. **Eyes**: In ventrolateral position, of medium size, widely separated dorsally, close to each other ventrally, ocelli elevated and large, somewhat less far separated from each other than eyes dorsally. **Antenna** (fig. 4): Rather short, with scapus of similar diameter as pedicellus, somewhat elongate and slender, pedicellus about two times length of scapus,



Figs. 9–20. Legs, hemelytron, abdomen, and genitalia of *Leptophysoderes orellana*, holotype, male. **9–11**. Legs of the left side, posterior view. **9**. Front leg. **10**. Middle leg. **11**. Hind leg. **12, 13**. Front leg in anterior (12) and lateral (13) views. **14**. Right hemelytron. **15**. Abdomen, ventral view. **16–18**. Pygophore in ventral (16), dorsal (17), and lateral (18) views. **19**, **20.** Aedeagus in dorsal (19) and lateral (20) views.

preflagelloid distinct, basiflagellomere and distiflagellomere of similar diameter, slightly incrassate, more slender than scapus and pedicellus, basiflagellomere somewhat shorter than pedicellus, basiflagellomere and distiflagellomere of roughly same length, only distal trichobothrium visible, and surrounded by a large oval membrane. **Labium** (fig. 2): First visible labial segment elongate and only moderately incrassate, reaching anterior margin of eye, second visible labial segment elongate, moderately incrassate at base, tapering toward apex, reaching the neck region of the head, third visible segment elongate and slender. **Thorax** (figs. 5–8): Pronotum almost 1.5 times as wide as long, anterior and posterior pronotal lobes distinct, separated by shallow depression, posterior lobe about two times length of anterior lobe; anterior margin of anterior lobe with distinct collar, lateral angles not produced, anterior lobe slender, about 2/3 width of posterior lobe, lateral margins rounded, median longitudinal depression of anterior lobe present as a wide and deep depression at posterior margin of lobe; posterior lobe wide, anterior lateral margins gently sloping, shallow median longitudinal depression and very shallow lateral depression close to posterior margin, posterior margin of posterior lobe with medium as well as lateral portion slightly convex, but without distinct lobe-like extensions. Scutellum triangular, median area slightly depressed, posteriorly produced into rounded, not flattened or extended, apex. Stridulitrum present, elongate; mesosternum with low median longitudinal ridge; metasternum with rounded median elevation, metepisternum without pronounced lobe that forms part of the mesocoxal cavity. **Legs** (figs. 9–13): Slender, all coxae short and incrassate, metacoxal comb absent, all trochanters long and with very narrow proximal portion; fore femur only slightly more incrassate than middle femur, all femora slender, all tibiae slender and straight, tibial comb of fore tibia set on large spur, fossula spongiosa on fore and middle leg absent, all tarsi with two segments, the first very short, the second elongate, claws simple, without teeth, parempodia setiform. **Hemelytron** (fig. 14): Hemelytron reaching median indentation of posterior abdominal margin, leathery quality of corium confined to exocorium, endocorium and cuneus essentially membranous, membrane also extending medially along the coastal margin of the exocorium (white arrow); proximal wing area with anterior vein bordering the corium presumably representing R + M, the posterior vein on the clavus is Pcu, the median vein Cu; membrane with only one cell (judging from comparison with position and shape of cells in other species of subfamily, e.g. *Physoderes* spp., anterior margin of this single cell formed by M, posterior by Pcu); Cu absent in membrane. **Abdomen** (fig. 15): Lateral abdominal margins almost parallel, posterior margin truncate with small median indentation, median area of mediosternites on segments 2–7 raised, lateral parts of mediosternites flat, intersegmental sutures barely defined, ventral laterotergite slender and in part covered by mediosternites. Stigmata 2–7 on small tubercles on mediosternites. **Genitalia**: **Segment 8 and pygophore** (figs. 16–18): Segment 8 narrow; pygophore small and rounded, with anterior portion (not visible externally when genitalia at rest) distinct from rounded body of pygophore, median anterior or dorsal area membranous, ventral margin with small process. **Parameres** (figs. 16, 17): Parameres with broad, truncate apex. **Aedeagus** (figs. 19, 20): Aedeagus small and slender, articulatory apparatus stout and heavily sclerotized, with well-developed median bridge and ductifer, basal plate extension not differentiated, thus articulatory apparatus apparently continuous with phallotheca, dorsal phallothecal sclerite weakly developed, ventral surface of phallotheca slightly more sclerotized than lateral portions.

Female: Unknown.

ETYMOLOGY: Named for the slender habitus and the slender legs compared with other Physoderinae, from Greek "leptos", meaning "thin".

Leptophysoderes orellana, new species
Figures 1–20

HOLOTYPE: *Male*: "Ecuador: Orellana [Province], Res. Ethnica Waorani, 1 km S.

Onkone Gate Camp, Trans. Ent., 30. Sept. 1996, 216.3 km 00°39′25.7″S, 76°27′10.8″W., T. L. Erwin, et al. leg., Insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in "terra firme" forest, Lot 1678, Trans. T-3". Held in trust at National Museum of Natural History, Washington, DC.

DIAGNOSIS: Recognized by the characters given in the generic diagnosis.

DESCRIPTION: *Male*: Length apex of clypeus to hind margin of abdomen/apex of wings: 4.58, greatest width across pronotum: 1.45. **Coloration** (fig. 1): General coloration uniformly brown, with labium, coxae, trochanter, and femora (apart from subapical ring) yellowish brown; **Head**: Brown with head capsule anterior to maxillary plates, labrum, and mark on clypeus between the bases of the mandibular plates yellowish brown, eyes dark reddish brown, ocelli with dark center and reddish margin. **Antenna**: Scapus brown with proximal and apical rings yellowish brown; pedicellus brown with narrow, proximal, yellowish brown ring; basiflagellomere pale brown with preflagelloid pale yellowish brown; distiflagellomere pale yellowish brown. **Labium**: Labium uniformly yellowish brown. **Thorax**: Pronotum and scutellum uniformly brown, pleura and thoracic sterna rather uniformly brown with lateral margin of posterior pronotal lobe and sternites somewhat paler. **Legs**: Coxae and trochanter yellowish brown, femora yellowish brown with subapical brown ring, tibiae and tarsi brown. **Hemelytron**: Rather uniformly brown with base, line along the claval suture, and area lateral of the pterostigma somewhat paler. **Abdomen**: Venter brown with submarginal row of irregular transverse yellowish brown marks.

MEASUREMENTS (in mm): Length of head: 0.6; length of anteocular portion: 0.25; length of postocular portion: 0.22; width of head: 0.51; length of synthlipsis: 0.28; length of antennal segments I:II:III:IV: 0.18:0.40:0.28:0.31; length of (visible) labial segments I:II:III: 0.37:0.52:0.14; length of anterior lobe of pronotum: 0.31; length of posterior lobe of pronotum: 0.61; width of pronotum: 1.45; length of scutellum: 0.51; length of hemelytron (posterior margin of pronotum to tip of wing): 2.88; maximum width of abdomen: 1.70.

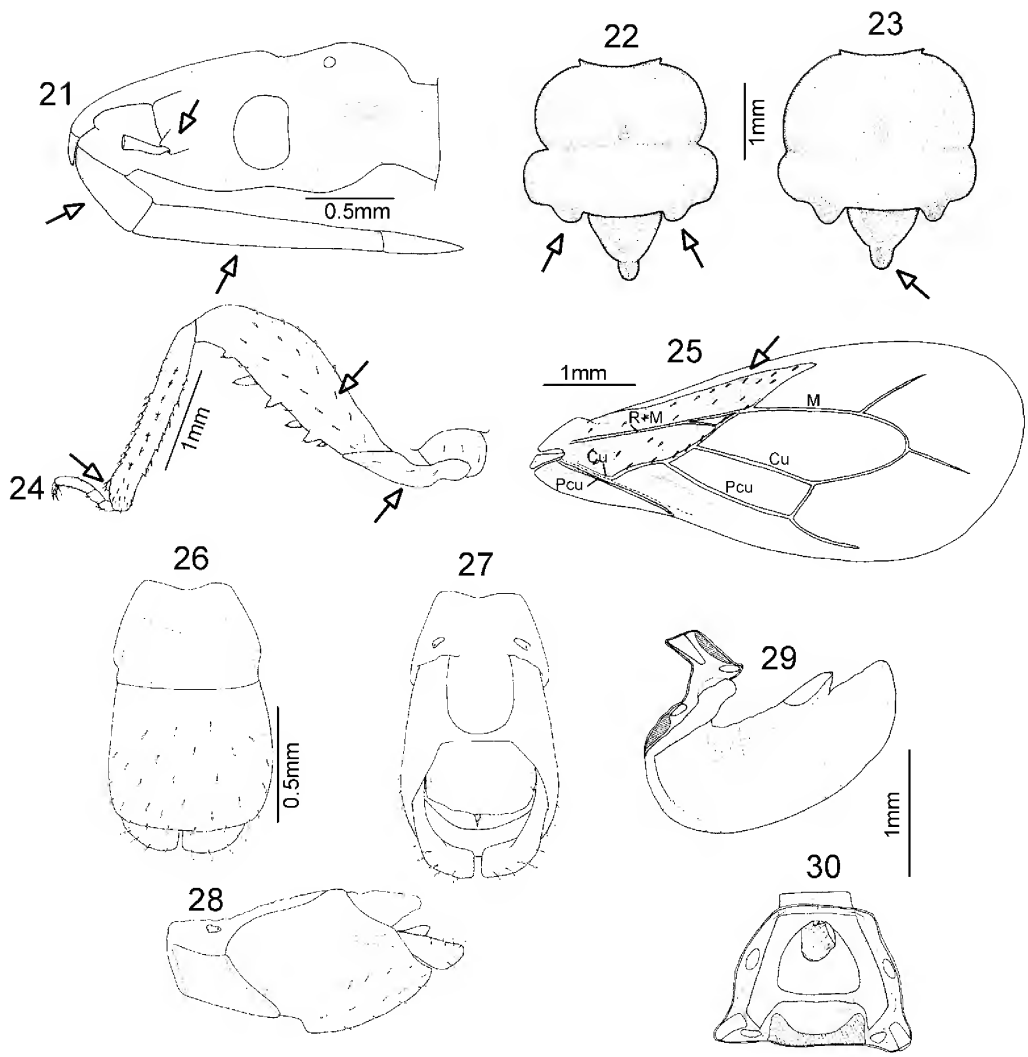
FEMALE: Unknown.

ETYMOLOGY: Named for Orellana Province in Ecuador.

DISTRIBUTION: Known only from the type locality in Ecuador.

REVISED DIAGNOSIS OF PHYSODERINAE
Figures 1–30

Head, body, and legs with spatulate setae inserted on tubercles (figs. 12, 13, 24, 25). Head elongate with transverse sulcus behind eyes (figs. 2, 3, 21). Mandibular and maxillary plates short (figs. 2, 3, 21). Ocelli present (figs. 2, 3, 21). Labium with second (visible) segment short or of medium length and straight, third (visible) segment long and often very slender (figs. 2, 21). Antennal insertion lateral (figs. 1, 21), not dorsolateral as in many other Reduviidae. Antenna relatively short, with basi- and distiflagellomere (first and second segment) slightly incrassate (fig. 4). Anterior pronotal lobe often very wide (e.g., in *Physoderes* Westwood or *Paulianocoris* Villiers, figs. 22, 23), but slender in other genera (e.g., *Tribelocephaloides* Villiers or *Leptophysoderes*, new genus, fig. 5). Posterior pronotal lobe with posterior, paramedian lobes (e.g., in *Physoderes* Westwood, figs. 22, 23, the Madagascan genera and *Cryptophysoderes* Wygodzinsky and Maldonado) or without such lobes (*Leptophysoderes*, new genus, fig. 5). Scutellum with apex produced, either rounded or dorsoventrally flattened and sometimes excavated (figs. 6, 22, 23). All trochanters long and proximally narrow (figs. 9–11, 24). Anterior and median femora often incrassate (fig. 24), but slender in some genera (*Befotaka* Villiers; *Henicocephaloides* Villiers; *Maroantsetra* Villiers; *Leptophysoderes*, new genus). Anterior and median femora with spatulate setae (figs. 9, 10, 24), ventrally sometimes also with spinelike protuberance beset with a short seta (fig. 24). Fore tibial comb on large spur (figs. 12, 13, 24). Fossula spongiosa absent on all pairs of legs (figs. 9–11, 24). Fully winged, hemelytral membrane usually with distinct venation (but indistinct in *Tribelocephaloides* Villiers), consisting of two cells, the anterior cell formed by



Figs. 21–30. *Physoderes* sp. (India). **21**. Head, lateral view. **22, 23**. Pronotum, dorsal view: male (22), female (23). **24**. Front leg, posterior view. **25**. Right hemelytron. **26–28**. Pygophore in ventral (26), dorsal (27), and lateral (28) views. **29**. Aedeagus, lateral view. **30**. Articulatory apparatus, frontal view.

media (M) and cubitus (Cu), the posterior by cubitus (Cu) and postcubitus (Pcu), distal margin of posterior cell usually almost straight, sometimes Cu absent (*Leptophysoderes*, new genus) (figs. 14, 25). Membrane extends at least slightly mediad along costal margin of exocorium (figs. 14, 25). Dorsal abdominal gland openings present on segments 3, 4, and 5.

DISCUSSION

More than 50 years after the creation of Physoderinae and the inclusion of numerous taxa, the diagnosis of the group is here revised. Some characters listed in the diagnosis occur sporadically in other groups of Reduviidae, but Physoderinae may be unambiguously identified by their combination. Also, by means of a future cladistic analysis some of those characters might prove to be apomorphic for Physoderinae. A membranous anterior margin of the corial part of the hemelytron is documented for only one Reduviinae, *Sphedanovarus camerunensis* (Breddin, 1903). A distinct spur on the fore tibia as the one present in Physoderinae, which bears the tibial

comb, is otherwise restricted to part of Harpactorinae (Davis 1969). A trochanter with a narrow, elongate basal portion is not documented for other Reduviidae, or for Pachynomidae.

One character thought to be diagnostic for Physoderinae by Miller (1954) is here removed from the diagnosis: a wing-to-wing coupling device is known to occur in the major groups of Heteroptera (Schuh and Slater, 1995) and is present in winged Reduviidae and Pachynomidae. Therefore, it does not appear to possess group-defining quality within Reduviidae.

Additional characters have so far only been examined for a limited number of species and genera, but might prove to be diagnostic for Physoderinae once the remaining taxa are studied. The coloration of the hind wing is only known for *Physoderes* and *Cryptophysoderes*, and is unusual among Reduviidae in being infumate. Male genitalia were examined only for *Physoderes* spp., *Cryptophysoderes fairchildi*, and *Leptophysoderes orellana*: These taxa share parameres with a broad and truncate apex, the aedeagus with heavily sclerotized and stout articulatory apparatus, as well as distinct median bridge and ductifer. The basal plate extension is poorly defined, so that the articulatory apparatus seems to connect directly to the phallotheca. Several more characters are known for an equally limited sample of taxa: Segment 8 of the male is very short (*Physoderes, Leptophysoderes*), metacoxal combs are absent (*Physoderes*, *Paulianocoris, Leptophysoderes*), the female sternal gland is present (*Physoderes*; Weirauch, 2004), and a male glandular area within the pygophore is present (*Physoderes*; Weirauch, 2003).

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