

Species of *Mystropini* (Coleoptera, Nitidulidae) Associated with Inflorescence of Palm *Ceroxylon quindiuense* (KARST.) H. WENDL. (Arecaceae) from Peru

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Abstract The paper presents an overview of species of the genus *Mystrops* MURRAY, 1864 collected on male inflorescence of the palm *Ceroxylon quindiuense* (KARST.) H. WENDL. (Arecaceae) in the Andes of Peru. They are *Mystrops delgadoi* sp. nov., *M. hisamatsui* sp. nov., *M. neli* sp. nov., *M. pulchra* sp. nov. and *M. rotundula* SHARP, 1889. Besides, *M. gigas* sp. nov., which is closely related to *M. hisamatsui* sp. nov. and *M. neli* sp. nov. and probably also associated with the same host plant, is also described from Ecuador.

Introduction

Family Nitidulidae of South America as many other insect groups still remain poorly studied. The rather important pollinators of palms from the tribe *Mystropini* have long been unnamed, as well as the species of *Mystropini* associated with cultivated plant species. The authors recently prepared a paper in which this gap in our knowledge is partly closed (KIREJTSHUK and COUTURIER, in press). This paper somehow presents a continuation of the latter paper, although it deals mostly with the species of *Mystropini* obtained from male inflorescence of one palm species of economic importance studied in the Andes of Peru.

In many species of Neotropical palms, inflorescences attract a high number of different insects (HENDERSON, 1986). However, among them the most part is represented by beetles from the families Curculionidae and Nitidulidae. Once floral bractlets are opened (usually at the end of the afternoon), anthesis begins and thousands of adult insects are attracted by flower smell. The composition of species and groups of weevils and sap beetles varies in accordance with genus and species of palms. The insects have been collected in an inflorescence of the palm *Ceroxylon quindiuense* (KARST.) H. WENDL. (Arecaceae). Nitidulidae of the inflorescences of *C. quindiuense* have never been studied before. As a result, the authors have found five species, four of which are actually undescribed. Besides, the description of one additional new species is added to the paper, because it seems to be a close relative to two newly described species from *Ceroxylon quindiuense*.

Palms of the genus *Ceroxylon* BONPL. are distributed along the Andes from Venezuela to Bolivia (GALEANO *et al.*, 2008; HENDERSON *et al.*, 1995) and grow between

800 and 3,500 m above the sea level. Twelve species of this dioecious plant genus are known and all are endemic to the Andes. *Ceroxylon quindiuense* “grows all along the Andes, between 2,000 and 3,000 m, in montane forests, usually forming characteristic, large populations of thousands of individuals” (GALEANO *et al.*, 2008). The stipes are used as building materials and various uses.

Material and methods

Five species of *Mystropini* examined for this paper have been collected on 20th September 2007 in Peru, Department of Amazonas, Province of Chachapoyas, District Molinopampa, road from Chachapoyas to Mendoza, locality Ocol, 06°15'48"S; 77°34'41"W, 2,370 m. They were collected in a single male inflorescence at the beginning of anthesis of *Ceroxylon quindiuense*. The collector climbed on the stipe of the palm to reach the inflorescence (Fig. 53). One whole inflorescence was put in a plastic bag and cut. The insects were anesthetized in this bag with an insecticide spray and after that they were separated from the inflorescence. In the field Nitidulidae have been separated from other insects, palm flowers and anthers present in the sample, and preserved in alcohol 70%. In the museum these specimens were divided into species. Part of them has been mounted on cards pinned in the traditional way and labelled for further study. Some larvae were also found in the palm inflorescence examined. However, it is impossible to define the species attribution of these larvae. Many unsorted adults of *Mystropini* are still in alcohol and they include mostly representatives of *Mystrops delgadoi* sp. nov., *M. pulchra* sp. nov., and *M. rotundula* SHARP, 1889. One species of *Mystrops* has been collected in Ecuador, at the North of Cotopaxi volcano, locality Papallacta, probably at about 3,400 m above sea level. Its host plant remains unknown, but it may be one of the *Ceroxylon* species as well. At least, species of this genus is present in the area of origin of the specimens.

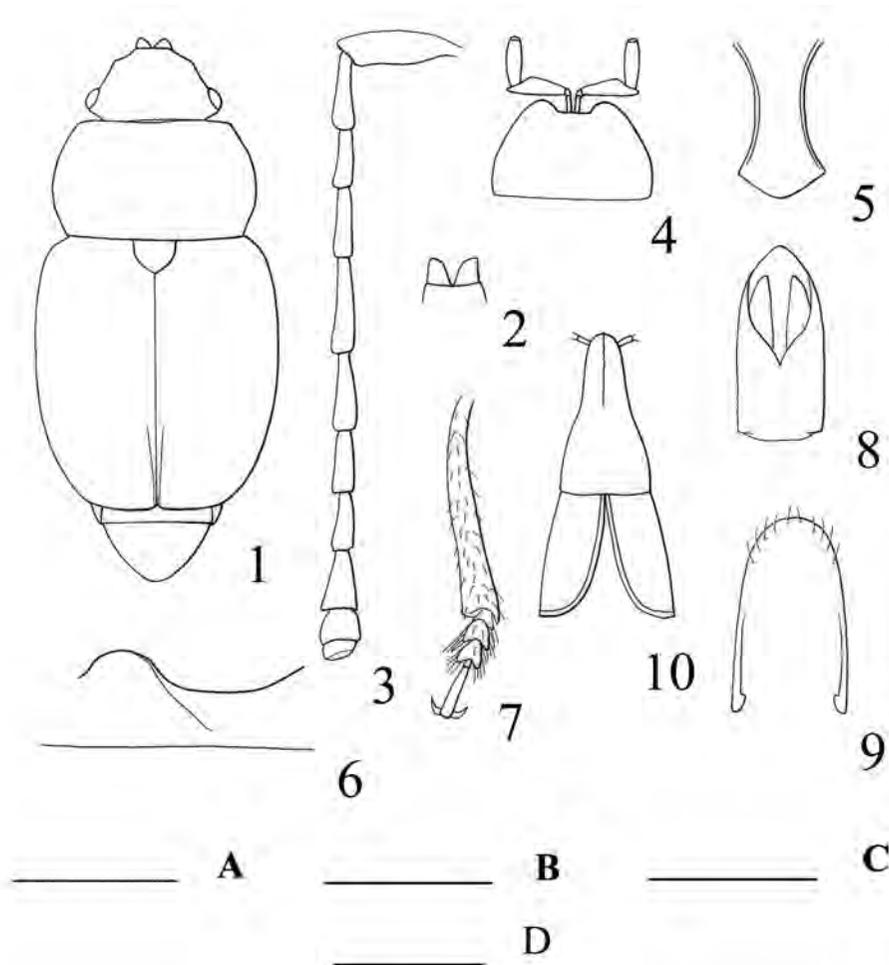
Depositories:

- BMNH – Natural History Museum in London (British Museum of Natural History);
- HNHM – Hungarian Natural History Museum, Budapest;
- MNHN – Museum National d’Histoire Naturelle, Paris;
- MZSP – Museu de Zoologia, Universidade de São Paulo;
- NMP – Národní Muzeum in Praha;
- NMW – Naturhistorisches Museum in Wien;
- NRS – Naturhistoriska Riksmuseet, Stockholm;
- SMNS – Staatliches Museum für Naturkunde, Stuttgart;
- UNAM – Universidad nacional Agraria La Molina, Lima;
- ZIN – Zoological Institute of the Russian Academy of Sciences, St. Petersburg;
- ZMB – Zoologisches Museum (Museum für Naturkunde an der Humboldt-Universität), Berlin.

Mystrops delgadoi sp. nov.

(Figs. 1–10, 54D, 54E)

Material. Holotype (MNHN), male and 161 paratypes (BMNH, MNHN, NMP, NMW, NRS, SMNS, UNAM, MZSP, ZIN, ZMB) – “Peru-Amazonas, Loc.



Figs. 1–10. *Mystrops delgadoi* sp. nov. — 1–9, Male, 10, female. — 1, Body, dorsal; 2, anterior part of head with labrum, anterodorsal; 3, antenna, dorsal; 4, mentum with labial palpi, ventral; 5, prosternal process, ventral; 6, left part abdominal ventrite 1 with submetacoxal line, ventral; 7, protibia and protarsus, dorsal; 8, penis trunk, dorsal; 9, tegmen, ventral; 10, ovipositor, ventral. Scale: A to fig. 1, bar 1.0 mm; B to fig. 2, bar 1.0 mm; C to figs. 3–7, bar 0.5 mm; D to figs. 8–10, bar 0.25 mm.

Ocol./Molinopampa, 20-IX-2007; G. Couturier, C. Delgado and K. Mejia”, “S 06°15’48”’; W 77°34’41”’, 2370 msnm, inflorescence ♂ *Ceroxylon quindiuense*, Arecaceae”.

Description of holotype (male). Length of body 3.1 mm, width 1.5 mm, height 1.0 mm. Elongate oval, rather convex dorsally and moderately convex ventrally; straw light brownish, elytra brown, head base and paramedian spots on pronotum rather infuscated without clear outline, apex of prosternal process, meso- and metaventrites and also epipleura nearly black; dorsum and underside with slight oily shine; dorsum with rather conspicuous and subrecumbent yellowish golden hairs 2.0–3.0 times as long as distance between their insertions; underside with finer, shorter, less conspicuous and recumbent hairs; lateral edges of pronotum and elytra not fringed, at posterior pronotal angles without clear “false angles” forming by longer hairs projecting posteriorly.

Head, pronotum and abdominal ventrites with small and shallow punctures (about as large as eye facets), interspaces between them 1.5–3.0 puncture diameters, with relief and fine cellular microreticulation. Elytra and pygidium with somewhat smaller and less distinct punctures, interspaces between them somewhat greater and with more relief microreticulation. Underside of head and prosternum with punctures similar to those on head and pronotum, but much sparser and with somewhat smoothed microreticulation between them. Metaventricle with punctures somewhat larger than eye facets, interspaces between them 1.0–2.0 puncture diameters and about as microreticulated as elytra and pygidium.

Head markedly shorter than distance between eyes, slightly convex at base, with a transverse (“fronto-clypeal”) line in a shallow transverse depression between antennal insertions, lateral edges above insertions of antennae strongly elevated, anterior edge of frons not clearly bordered and somewhat emarginate; eyes comparatively small and very finely faceted; temples absent. Labrum with moderately projecting lobes (about 1/3 as long as wide), separately obliquely abrupt, with a deep and wide V-shaped median excision. Mandibles moderately exposed from under frons. Antennae about 3.5 times as long as the head width across eyes; scape nearly 4.5 times as long as wide and markedly longer than club, somewhat thicker than subcylindrical to slightly subconical flagellomeres; antennomere 2 slightly longer than antennomere 3 and shorter antennomeres 4–6; antennomeres 7 about as long as antennomere 2, antennomere 8 about as long 3; club comprising about 1/8 of total antennal length, rather elongate and almost symmetrical, with longest subtriangular antennomere 9, antennomere 10 transverse and about 1/2 as long as antennomere 9; ultimate antennomere shortest and somewhat incerted inside previous one; antennomeres without long and sparse setae. Pronotum widest behind the middle, almost 1 and 4/5 as wide as long; its anterior and posterior edges nearly straight, not bordered; sides rather arcuate, extremely narrowly canalicular; anterior angles widely rounded and posterior angles with a distinct top; disk slightly and gently convex. Scutellum large, subtriangular and with subrounded apex. Elytra widest along anterior half, slightly longer than their combined width, longest at suture and leaving uncovered the pygidium and most part of the preceding tergite; their lateral edges very broadly arcuate to almost straight, not explanate, just visible simultaneously from above, adsutural lines expressed in distal 1/3. Pygidium slightly convex and very widely rounded at apex. Widely subtruncate and flattened apex of anal sclerite clearly exposed.

Mentum markedly less than twice as wide as long, arcuately narrowing anteriorly and excised at anterior edge, its anterior angles somewhat projecting anteriorly. Ultimate maxillary palpomere subcylindrical to slightly narrowing apically, more than 6.0 times as long as thick. Ultimate labial palpomere oval to subcylindrical to slightly narrowing apically, about 3.5 times as long as thick. Antennal grooves not expressed and subparamental grooves slightly expressed, subparallel. Prosternum slightly convex along the middle and with process narrow, medially subflattened and roof-like at apex, scarcely curved along coxae, its apex rather widened before arrow-like posterior edge, with maximal width nearly 1/2 of width of antennal club and with distinct outer angles. Ratio of distances between pro-, meso- and metacoxae about as 1.0 : 1.5 : 3.0. Metaventricle medially subflattened and without clear median line, its posterior edge between coxae very shallowly emarginate. Submetacoxal line very distinct, but not reaching posterior edge of abdominal ventrite 1. Abdominal ventrite 1 about 1.5 times as long as hypopygidium and somewhat longer than ventrites 2 and 3 combined; hypopygidium widely arcuate at

posterior edge. Epipleura at base about 1.5 times as wide as prosternal process, moderately elevated laterally.

Tibiae slightly widened, all with almost straight inner edge and comparable in width at apex (slightly wider than antennal club), widest at apex, outer subapical angle of all tibiae not projecting and more or less oblique, outer edge of meso- and metatibiae with rows of extremely short and fine setae. Femora of usual shape, all with more or less convex anterior and posterior edges, pro- and metafemora somewhat about 3 times, mesofemur about 2.5 times as wide as corresponding tibiae. Tarsi of usual structure; protarsus about 4/5 as wide as tibiae, meso- and metatarsi somewhat narrower; claws simple.

Aedeagus moderately sclerotized; tegmen subparallel-sided in basal 1/2 and almost gradually narrowing to arcuate apex with short hairs; penis trunk about as long as tegmen, subparallel-sided in basal 2/3 and gradually narrowing to subacuminate apex.

Female. Differs from male in both pygidium and hypopygidium widely rounded at apex, and also much shorter antennae, only slightly overpassing behind pronotal base, narrower head, subtrapezoid pronotum with most width at posterior angles. Ovipositor feebly pigmented, its gonocoxites moderately long (a little longer than valvifer) with simple apex and moderately long styli.

Variations and sexual dimorphism. Length of body 2.5–3.5, width 1.3–1.6 mm. Not infrequently coloration is much darker than that in holotype, up to subunicolorous dark body, although, apex of head, apex of abdomen and appendages always red (except darkened apex of antennal club). In most cases males are markedly larger than females. The sexual dimorphism in shape of sclerites of ultimate abdominal segment and tarsi is rather stable, however, antennal club and other structures show a variability making problematical to determine the sex of specimens. Rather frequently elytra remain uncovered not only the apex pygidium (in most females). The puncturation, pubescence and microsculpture of integument show some variability.

Diagnosis. This new species should be regarded in one group together with *M. bondari* GILLOGLY, 1955; *M. debilis* ERICHSON, 1843; *M. heterocera* SHARP, 1889; *M. lucanoides* JELÍNEK, 1969 and also four species described in KIREJTSHUK and COUTURIER in press. It is well characterized by its peculiar coloration, puncturation and sculpture of dorsum, comparatively smaller and finely faceted eyes, male pronotum narrowed at base, lack of median suture of metaventrite, and also genital structures. Besides, it can be also distinguished from:

– *M. bondari* GILLOGLY, 1955 by the somewhat more slender body, shorter labral lobes, posterior angles not projecting posteriorly, elytra longest at apex, more clear subparamental grooves, arrow-liked apex of prosternal process, narrower tibiae, widely rounded apex of male pygidium, frequently longer male antennae;

– *M. debilis* ERICHSON, 1843 by the somewhat more robust body; denser and more conspicuous dorsal pubescence; shorter labral lobes; posterior angles not projecting posteriorly; elytra longest at apex; not so transverse, but subtriangular mentum; more clear subparamental grooves; arrow-liked apex of prosternal process and narrower tibiae;

– *M. heterocera* SHARP, 1889 by the more slender and less convex body (without a clear dimorphism in size); shorter, denser and more conspicuous dorsal pubescence; clear and comparatively deep depression between antennal insertions; much longer elytra, longer antennae of both sexes, without very long hairs and subtriangular antennal club including very long antennomere 9; not so transverse, but subtriangular mentum; not curved prosternal process along coxae and sublattened metaventrite;

– *M. lucanoides* JELÍNEK, 1969 by the much shorter mandibles in males and females; somewhat more robust body; longer, denser and more conspicuous dorsal pubescence; somewhat longer frons; somewhat thicker antennae; longer elytra with oblique apices; not so transverse, but subtriangular mentum; arrow-liked apex of prosternal process and narrower tibiae.

Etymology. Epitet of this new species is devoted to C. DELGADO, entomologist from Peru and friend of the second author of this paper.

***Mystrops gigas* sp. nov.**

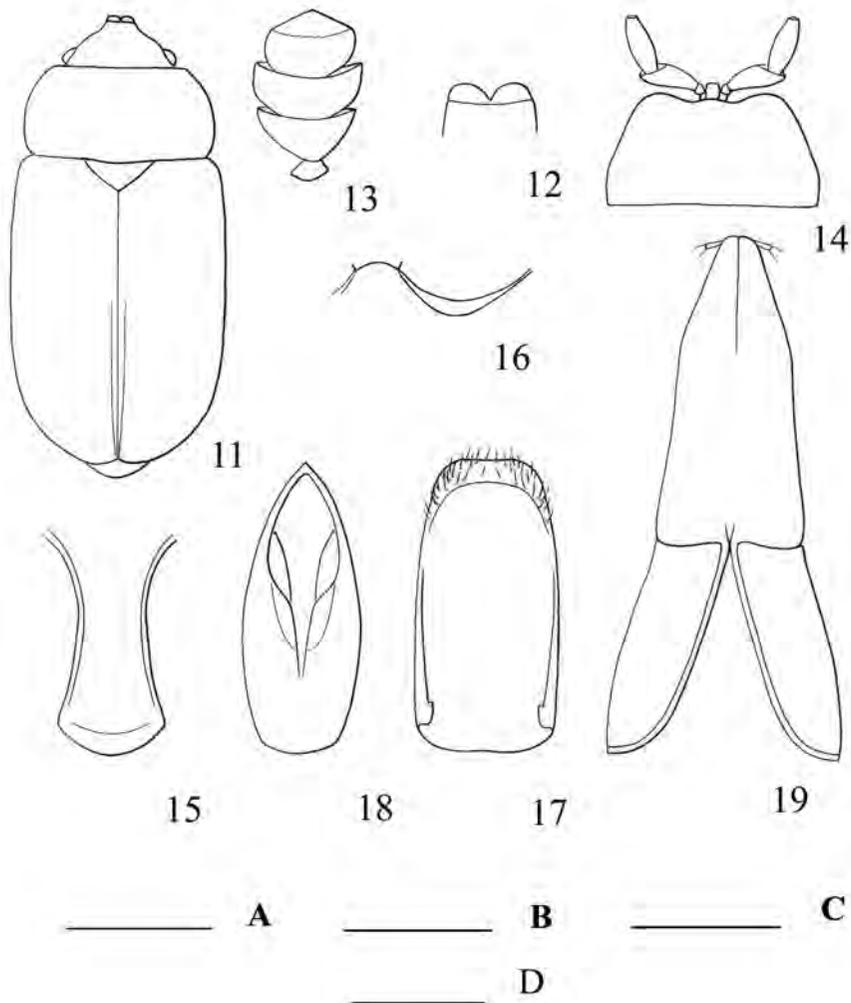
(Figs. 11–19, 54A)

Material. Holotype (ZIN), male and 35 paratypes (BMNH, MNHN, NMP, SMNS, ZIN, ZMB) – Ecuador, “Papallacta, Cotopaxi, flowers of ? Aloa, 4000 m, 25.03.2001, T. Vereschagina”; 2 paratypes (ZMB) – “Loja, Ostecordill, Ornillos Condor, F. Ohs, 13.9.05”.

Description of holotype (male). Length of body 4.4 mm, width 2.0 mm, height 1.0 mm. Elongate oval, slightly convex dorsally and ventrally; black with brownish tarsi; dorsum and underside with a moderate shine and bronze tint; dorsum and underside with rather fine and slightly conspicuous subrecumbent yellowish grey hairs, somewhat longer than distance between their insertions; lateral edges of pronotum and elytra sparsely fringed, at posterior pronotal angles without clear “false angles” forming by longer hairs projecting posteriorly.

Head, pronotum with small and distinct punctures (almost as large as eye facets), interspaces between them 2–4 puncture diameters, with relief and moderately fine wavy microreticulation. Elytra with punctures similar to those on head and pronotum, with surrounding space a little depressed and forming short and oblique depressions, interspaces between them 3–5 puncture diameters and with somewhat smooth microreticulation of very small punctures. Pygidium with somewhat larger and less distinct punctures, somewhat larger than those on other dorsal sclerites, interspaces between them slightly greater than a puncture diameter and with more relief microreticulation. Underside of head and prothorax with very sparse and small punctures, interspaces between them with very dense microreticulation. Metaventricle and abdominal ventrites with puncturation and sculpture, somewhat similar to those on head and pronotum, but on metaventricle punctures somewhat sparser and smaller, and on abdominal ventrites punctures denser and on ventrite 1 they also somewhat larger.

Head about as long as distance between eyes, subflattened almost along whole length, with a transverse (“fronto-clypeal”) line in a very shallow transverse depression between antennal insertions, lateral edges above insertions of antennae very slightly elevated, anterior edge of frons not clearly bordered and very shallowly emarginate; eyes moderately small and very finely faceted; temples scarcely present. Labrum with moderately projecting lobes (about 1/4 as long as wide), arcuately outlined, with a deep and wide V-shaped median excision. Mandibles slightly exposed from under frons. Antennae slightly longer than the head width across eyes; scape nearly twice as long as wide and about 2/3 as long as club, somewhat thicker than subconical flagellomeres; antennomere 2 as long as antennomeres 3–5 taken separately and about 2.5 times as long as antennomeres 6–8; club comprising about 2/7 of total antennal length, suboviform and



Figs. 11–19. *Mystrops gigas* sp. nov. — 11–18, Male, 19, female. — 11, Body, dorsal; 12, anterior part of head with labrum, anterodorsal; 13, antennal club, dorsal; 14, mentum with labial palpi, ventral; 15, prosternal process, ventral; 16, submetacoxal line, ventral; 17, tegmen, ventral; 18, penis trunk, dorsal; 19, ovipositor, ventral. Scale: A to fig. 11, bar 1.0 mm; B to fig. 12, bar 1.0 mm; C to figs. 13–16, bar 0.5 mm; D to figs. 17–19, bar 0.25 mm.

almost symmetrical, antennomere 9 and 11 comparable in length; antennomeres with very sparse long setae. Pronotum widest at the middle, a little more than twice as wide as long; its anterior and posterior edges nearly straight, posterior one narrowly bordered; sides gently arcuate, extremely narrowly canalicular; anterior angles widely rounded and posterior angles with a distinct top; disk slightly and gently convex. Scutellum large, subtriangular and with widely rounded apex. Elytra widest along anterior 3/4, about 2.4 times as long as their combined width, longest at suture and leaving uncovered only the apex of pygidium; their lateral edges almost rectilinear along anterior 3/4, not explanate, just visible simultaneously from above, adsutural lines expressed in distal 1/4. Pygidium

slightly convex and very widely rounded at apex. Widely subtruncate and nearly flattened apex of anal sclerite clearly exposed.

Mentum markedly less than twice as wide as long, arcuately narrowing anteriorly and excised at anterior edge, its anterior angles somewhat projecting anteriorly. Ultimate maxillary palpomere subcylindrical to slightly narrowing apically, more than 3.5 times as long as thick. Ultimate labial palpomere oval to subcylindrical to slightly narrowing apically, about 2.5 times as long as thick. Antennal grooves well expressed and convergent posteriorly, subparamental grooves scarcely expressed and convergent. Prosternum slightly convex along the middle and with process moderately curved along coxae, its apex rather widened before convex posterior edge, with maximal width less than width of antennal club and with almost distinct outer angles. Ratio of distances between pro-, meso- and metacoxae about as 1.0 : 1.0 : 2.5. Metaventrite medially subdepressed and with a clear median line, its posterior edge between coxae shallowly subangulately excised. Submetacoxal line very distinct, but slightly deviating from posterior edge of abdominal ventrite 1. Abdominal ventrite 1 about twice as long as hypopygidium and about as long as ventrites 2–4 combined; hypopygidium widely arcuate to subtruncate at posterior edge. Epipleura at base about as wide as prosternal process, moderately elevated laterally.

Tibiae moderately widened apically, all with almost straight inner edge and comparable in width at apex (slightly narrower than antennal club), outer subapical angle of meso- and metatibiae slightly and outer subapical angle of protibia moderately projecting, outer edge of meso- and metatibiae with rows of moderately short and stout setae. Femora of usual shape, all with more or less convex anterior and posterior edges, profemur about 1 and 2/3, mesofemur about twice and metafemora almost 2.5 times as wide as corresponding tibiae. Tarsi of usual structure; protarsus about 3/4 as wide as tibiae, meso- and metatarsi somewhat narrower; claws somewhat toothed at base.

Aedeagus well sclerotized; tegmen subparallel-sided in basal 4/5 and somewhat narrowing to shallowly emarginate apex with moderately short hairs; penis trunk about as long as tegmen, broadly arcuate at sides and gradually narrowing to subacuminate apex.

Female. Differs from male only in both pygidium and hypopygidium widely rounded at apex, and also somewhat narrower protarsi. Ovipositor moderately pigmented, its gonocoxites moderately long (about 1 and 1/3 as long as valvifer) with simple apex and moderately long styli.

Variations and sexual dimorphism. Length of body 4.1–5.9, width 2.0–2.6 mm. The sexual dimorphism in shape of sclerites of ultimate abdominal segment and protarsi is rather stable. The puncturation, pubescence and microsculpture of integument show some variability.

Diagnosis. This new species together with *M. hisamatsui* sp. nov. and *M. neli* sp. nov. form a separate group not included in list of the groups given in KIREJTSHUK and COUTURIER in press. In some sense they are rather similar to species of *Nitidulora* REITTER, 1873 (KIREJTSHUK and JELÍNEK, 2000), differing mostly in the black and subunicolorous body, not widely explanate pronotal sides, clear adsutural lines in distal part of elytra and not bilobed tegmen. Thus, this group could be provisionally regarded as a group in composition of the genus *Mystrops* sensu lato. In contrast to other groups of the genus it is characterized by the nearly black, moderately convex and elongate oval body, pronotum not or slightly narrowed at base, sexual dimorphism is not expressed in antennae and elytral apices; dorsal pubescence short to moderately long and subrecumbent. The bionomy of the species of *Nitidulora* remain unknown, while the species of the group here proposed seem to be associated with male inflorescence of *Ceroxylon quindiuense*.

The species of this group can be diagnosed after the following differences:

– *M. gigas* sp. nov. by the body more elongate and large, 4.1–5.9 mm long 2.0–2.6 mm wide; pronotum evenly convex; all appendages black and abdomen, except brown tarsi; integument with a clear bronze tint, puncturation sparser and finer, pubescence sparser, more recumbent and less conspicuous; frons with a clear transverse line between antennal insertions; antennae with shorter and sparser hairs, club as shaped as on Fig. 13; elytra longest at suture (suboblique at apex), subparallel-sided in most length, about 1 and 1/3 as long as combined width; submetacoxal line slightly deviating from posterior edge of coxal cavities (reaching distal 2/5 of ventrite 1); hypopygidium subtruncate at apex; tegmen shallowly emarginate at apex; penis with acute apex and broadly arcuate at sides; ovipositor as shaped as on Fig. 19;

– *M. hisamatsui* sp. nov. by the body more oval and smaller, 3.1–3.5 mm long 1.6–1.9 mm wide; pronotum with evenly convex disc and steeply sloping sides; mandibles, palpi, legs and most part of abdomen brown to brownish reddish; integument sometimes with a very slight bronze metallic tint, puncturation denser and coarser, pubescence denser, less recumbent and more conspicuous; frons without transverse line between antennal insertions; antennae with longer and denser hairs, club as shaped as on Fig. 22; elytra separately rounded at apex, broadly arcuate at sides, about 1 and 1/9 as long as combined width; submetacoxal line scarcely deviating from posterior edge of coxal cavities; hypopygidium widely rounded at apex; tegmen gently rounded at apex; penis with arrow-liked apex and not broadly arcuate at sides; ovipositor as shaped as on Fig. 29;

– *M. neli* sp. nov. by the body more oval and large, 3.6–5.5 mm long 1.8–2.7 mm wide; pronotum evenly convex; mandibles, palpi, legs and most part of abdomen brown to brownish; integument without any metallic tint, puncturation denser and coarser, pubescence denser, less recumbent and more conspicuous; frons with a clear transverse line between antennal insertions; antennae with longer and denser hairs, club as shaped as on Fig. 40; elytra longest at suture (suboblique at apices), broadly arcuate at sides, about 1 and 1/8 as long as combined width; submetacoxal line strongly deviating from posterior edge of coxal cavities (reaching distal 1/5 of ventrite 1); hypopygidium subtruncate at apex; tegmen widely rounded at apex; penis with acute apex and suparallel-sided in most length; ovipositor as shaped as on Fig. 32.

Etymology. Epitet of this new species is originated from the Greek “gigantes” with meaning “giant”.

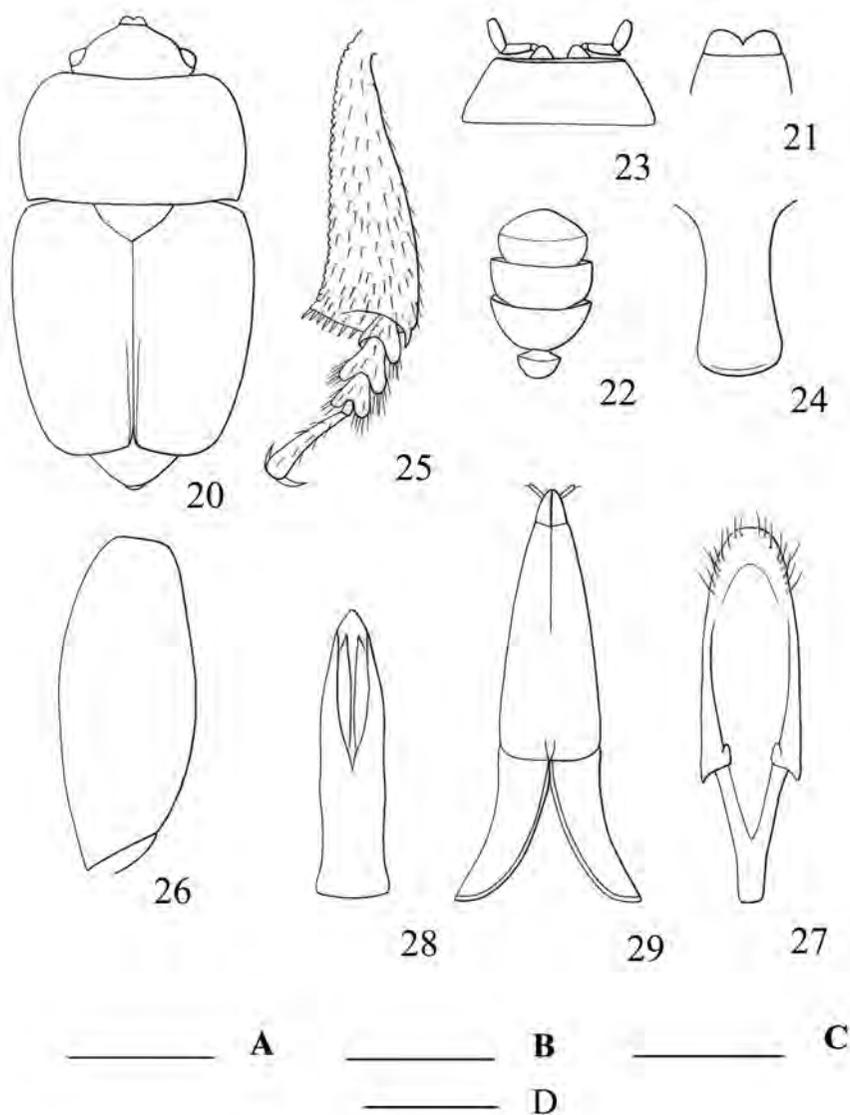
***Mystrops hisamatsui* sp. nov.**

(Figs. 20– 29, 54C)

Material. Holotype (MNHN), male and 68 paratypes (MNHN, UNAM, MZSP, ZIN) – “Peru-Amazonas, Loc. Ocol./Molinopampa, 20-IX-2007; G. Couturier, C. Delgado and K. Mejia”, “S 06°15’48’’; W 77°34’41’’”, 2370 msnm, inflorescence ♂ *Ceroxylon quindiuense*, Areaceae”.

Notes. Some characters of this new species shared with the previous one are omitted in the bellow description.

Description of holotype (male). Length of body 3.2 mm, width 1.6 mm, height 1.0 mm. Elongate oval, moderately convex dorsally and slightly ventrally; black with brownish reddish mandibles, palpi, legs and most part of abdomen; dorsum and underside with a slight shine and without metallic tint; dorsum and underside with fine and moderately conspicuous subrecumbent yellowish hairs, somewhat more than twice as long as distance



Figs. 20–29. *Mystrops hisamatsui* sp. nov. — 20–28, Male; 29, female. — 20, Body, dorsal; 21, anterior part of head with labrum, anterodorsal; 22, antennal club, dorsal; 23, mentum with labial palpi, ventral; 24, prosternal process, ventral; 25, protibia and protarsus, dorsal; 26, profemur, ventral; 27, tegmen, ventral; 28, penis trunk, dorsal; 29, ovipositor, ventral. Scale: A to fig. 20, bar 1.0 mm; B to fig. 21, bar 1.0 mm; C to figs. 22–26, bar 0.5 mm; D to figs. 27–29, bar 0.25 mm.

between their insertions; lateral edges of pronotum and elytra densely fringed, at posterior pronotal angles with slight “false angles” forming by longer hairs projecting posteriorly.

Head with small and distinct punctures (more or less larger than eye facets), interspaces between them less than a puncture diameter, with somewhat smoothed microreticulation. Pronotum with similar or somewhat larger punctures, interspaces between them on disc 2–4 puncture diameters and more smoothed, interspaces at sides as

great as those on head and as sculptured as on head. Elytra and pygidium with punctures similar to those on head and pronotum or a little smaller, interspaces between them about or less than a puncture diameter and rather smoothed. Underside of head and prothorax with very sparse and small punctures, interspaces between them with extremely dense and fine microreticulation. Metaventrite and abdominal ventrite 1 with punctures much larger than eye facets, interspaces between them 1.0–2.5 puncture diameters and densely and cellularly microreticulated. The rest abdominal ventrites with puncturation and sculpture, somewhat similar to those on head and pronotum, but punctures somewhat denser and larger.

Head about 4/5 as long as distance between eyes, subflattened almost along whole length, without both transverse (“fronto-clypeal”) line and transverse depression between antennal insertions, lateral edges above insertions of antennae very slightly elevated, anterior edge of frons not clearly bordered and very shallowly emarginate; eyes moderately large and very finely faceted; temples scarcely present. Labrum with moderately projecting lobes (about 1/3 as long as wide), arcuately outlined, with a deep and wide V-shaped median excision. Mandibles moderately exposed from under frons. Antennae about as long as the head width across eyes; scape nearly twice as long as wide and about 2/3 as long as club, much thicker than subconical flagellomeres; antennomere 2 as long as antennomere 3, antennomeres 4 and 5 somewhat shorter than previous, but longer than antennomeres 6–8; club comprising about 2/7 of total antennal length, suboval and slightly asymmetrical, antennomere 9 and 11 comparable in length; antennomeres with very sparse and not very long setae. Pronotum widest at the middle, about twice as wide as long; its anterior edge very shallowly emarginate and posterior edge slightly sinuate at posterior angles, posterior one narrowly and distinctly bordered; sides gently arcuate, extremely narrowly canalicular; anterior angles widely rounded and posterior angles obtuse; disk slightly and gently convex. Scutellum large, subtriangular and with widely rounded apex. Elytra widest somewhat before the middle, about 1 and 1/7 as long as their combined width, regularly and separately rounded at apices, leaving uncovered most part of pygidium; their lateral edges very broadly arcuate, not explanate, just visible simultaneously from above, adsutural lines expressed in distal 1/2. Pygidium slightly convex and very widely rounded at apex. Widely subtruncate and nearly flattened apex of anal sclerite clearly exposed.

Mentum markedly less than twice as wide as long, subtrapezoid, with distinct anterior and posterior angles. Antennal grooves distinct rectilinear and slightly convergent posteriorly, subparamental grooves well expressed and convergent. Prosternum slightly convex along the middle and with process narrow, medially slightly convex up to apex, moderately curved along coxae, its apex rather widened before convex posterior edge, with maximal width about as width of antennal club and with rounded outer angles. Ratio of distances between pro-, meso- and metacoxae about as 1.0 : 1.0 : 2.0. Metaventrite medially subdepressed and with a clear median line. Submetacoxal line very distinct, but slightly deviating from posterior edge of abdominal ventrite 1 as that in *M. neli* sp. nov. Abdominal ventrite 1 about 1.5 times as long as hypopygidium and about as long as ventrites 2–4 combined; hypopygidium widely arcuate at posterior edge. Epipleura at base somewhat narrower than prosternal process, moderately elevated laterally.

Tibiae rather widened apically, pro- and mesotibiae about as wide as antennal club, metatibia somewhat narrower; outer edge of meso- and metatibiae with rows of moderately short and very stout setae. Femora less narrowing posterior and with almost straight posterior edge, profemur about twice, mesofemur more than twice and

metafemora almost 2.5 times as wide as corresponding tibiae. Tarsi of usual structure; protarsus about 1/2 as wide as tibiae, meso- and metatarsi somewhat narrower; claws somewhat toothed at base.

Aedeagus moderately sclerotized; tegmen subparallel-sided in basal 4/5 and somewhat narrowing to gently rounded apex and with moderately short hairs along it; penis trunk somewhat longer than tegmen, somewhat curved along sides and with arrow-shaped apex.

Female. Differs from male only in both pygidium and hypopygidium widely rounded at apex, and also somewhat narrower protarsi. Ovipositor moderately pigmented, its gonocoxites rather long (about twice as long as valvifer) with simple apex and moderately long styli.

Variations and sexual dimorphism. Length of body 3.1–3.5, width 1.6–1.9 mm. The sexual dimorphism in shape of sclerites of ultimate abdominal segment and protarsi is rather stable. The puncturation, pubescence and microsculpture of integument show some variability, sometimes integument with a very slight bronze tint.

Diagnosis. See diagnosis of *M. gigas* sp. nov. Besides, this new species have larger punctures on its dorsum, more stout legs, almost straight anterior edge of protibiae and the outer edge of its meso- and metatibiae are with rather stout and short setae and with comparatively long hairs.

Etymology. Epitet of this new species is devoted to Sadanari HISAMATSU, one of greatest specialist on Cucujoid families of Coleoptera of the second half of the last century.

***Mystrops neli* sp. nov.**

(Figs. 30–40, 54B)

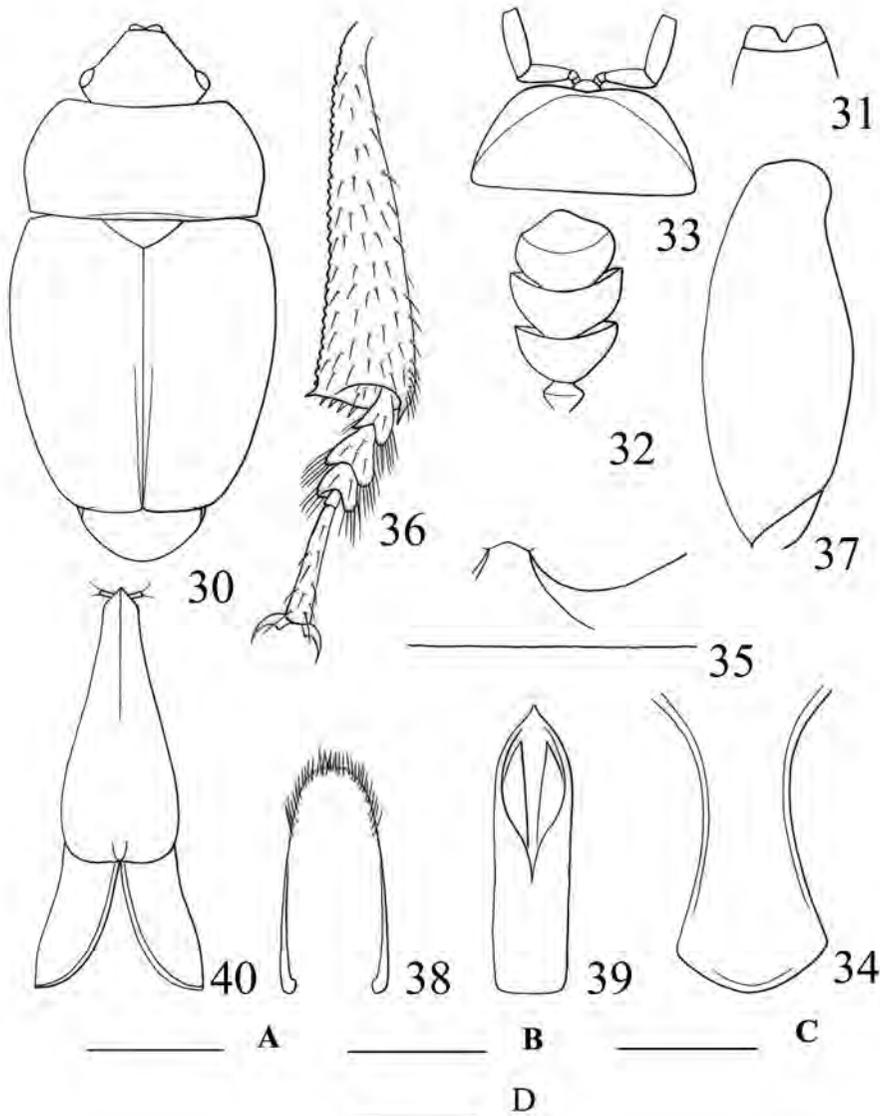
Material. Holotype (MNHN), male and 59 paratypes (BMNH, MNHN, SMNS, UNAM, MZSP, ZIN, ZMB) – “Peru-Amazonas, Loc. Ocol./Molinopampa, 20-IX-2007; G. Couturier, C. Delgado and K. Mejia”, “S 06°15'48"; W 77°34'41", 2370 msnm, inflorescence ♂ *Ceroxylon quindiuense*, Arecaceae”.

Notes. Some characters of this new species shared with two previous ones are omitted in the bellow description.

Description of holotype (male). Length of body 5.3 mm, width 2.4 mm, height 1.0 mm. Elongate oval, slightly convex dorsally and ventrally; black with brownish palpomeres and legs and somewhat lightened abdominal apex; dorsum and underside with a moderate shine and without metallic tint; dorsum and underside with rather fine and slightly conspicuous subrecumbent dark grey hairs, 2.0–3.0 times as long as distance between their insertions, sides of underside and with longer and grey yellowish hairs, becoming longer to abdominal apex; lateral edges of pronotum and elytra densely fringed, at posterior pronotal angles with slight “false angles” forming by longer hairs projecting posteriorly.

Head with small and distinct punctures (slightly larger as eye facets), interspaces between them somewhat more than a puncture diameters, with cellular and somewhat smoothed microreticulation. Pronotum with somewhat smaller and much sparser punctures, interspaces between them 2–4 puncture diameters at disc, with relief cellular microreticulation at sides, becoming smoothed at disc. Elytra with punctures similar to those on head and pronotum, with surrounding space a little depressed, interspaces between them 2–3 puncture diameters and with somewhat smooth microreticulation of

very small punctures. Underside of head and prothorax with very sparse and small punctures, interspaces between them with very dense microreticulation. Metaventricle with very sparse and small punctures, interspaces between them 5–7 puncture diameters and with cellular microreticulation. Abdominal ventrites with puncturation and sculpture, somewhat similar to those on metaventricle, but punctures somewhat sparser.



Figs. 30–40. *Mystrops neli* sp. nov. — 30–39, Male; 40, female. — 30, Body, dorsal; 31, anterior part of head with labrum, anterodorsal; 32, antennal club, dorsal; 33, mentum with labial palpi, ventral; 34, prosternal process, ventral; 35, left part abdominal ventrite 1 with submetacoxal line, ventral; 36, protibia and protarsus, dorsal; 37, profemur, ventral; 38, tegmen, ventral; 39, penis trunk, dorsal; 40, ovipositor, ventral. Scale: A to fig. 30, bar 1.0 mm; B to fig. 31, bar 1.0 mm; C to figs. 32–37, bar 0.5 mm; D to figs. 38–40, bar 0.25 mm.

Head about as long as distance between eyes, subflattened almost along whole length, without transverse (“fronto-clypeal”) line, but with a shallow transverse depression between antennal insertions, anterior edge of frons very shallowly emarginate; eyes moderately small and very finely faceted; temples scarcely present. Labrum with moderately projecting lobes (about 1/4 as long as wide), subtruncate, with a not deep V-shaped median excision. Antennae about 1.5 times as long as the head width across eyes; scape nearly 2.5 times as long as wide and longer than club, about twice thicker than subconical flagellomeres; antennomere 3 somewhat longer than antennomeres 2 and 4–5 taken separately and about 1.5 times as long as antennomeres 6–8; club comprising about 1/4 of total antennal length, suboviform, about 1 and 1/3 as long as wide and almost symmetrical, antennomere 9 and 11 comparable in length; antennomeres with very sparse long setae. Pronotum widest at the middle, about twice as wide as long; its anterior edge very slightly emarginate and posterior edge nearly convex, posterior one clearly bordered at scutellum; sides gently arcuate, extremely narrowly canalicular; anterior and posterior angles widely arcuate; disk slightly and gently convex. Scutellum large, subtriangular and with widely rounded apex. Elytra widest before the middle, about 1.5 times as long as their combined width, separately and widely rounded as apices and leaving uncovered the most part of pygidium; their lateral edges very widely arcuate, very narrowly explanate, adsutural lines expressed in distal half but not reaching the middle of them. Pygidium slightly convex and clearly truncate at apex. Rounded and convex apex of anal sclerite clearly exposed.

Mentum markedly more than twice as wide as long, arcuately narrowing anteriorly and shallowly emarginate at anterior edge, its anterior angles widely rounded. Antennal and subparamental grooves well expressed and subrectilinearly convergent. Prosternum slightly convex along the middle and with process slightly curved along coxae, its apex rather widened before convex posterior edge, with maximal width less than width of antennal club and with almost distinct outer angles. Ratio of distances between pro-, meso- and metacoxae about as 1.0 : 1.5 : 2.5. Metaventrite medially subdepressed and with a slight median line in distal half. Submetacoxal line very distinct, but strongly deviating from posterior edge of abdominal ventrite 1. Abdominal ventrite 1 about slightly longer than hypopygidium and markedly shorter than ventrites 2–4 combined; hypopygidium widely arcuate at posterior edge. Epipleura at base about as wide as prosternal process, moderately elevated laterally.

Tibiae moderately widened apically, all with almost straight inner edge and comparable in width at apex (markedly narrower than antennal club), outer subapical angle of tibiae slightly projecting, outer edge of meso- and metatibiae with rows of moderately short and stout setae. Femora of usual shape, all with more or less convex anterior and posterior edges, pro- and meso femora about twice, and metafemora almost 2.5 times. Tarsi of usual structure; protarsus about 3/5 as wide as tibiae, meso- and metatarsi somewhat narrower; claws somewhat toothed at base.

Aedeagus well sclerotized; tegmen somewhat narrowing to widely rounded apex and with moderately short hairs; penis trunk about 1 and 1/4 as long as tegmen, subparallel-sided and gradually narrowing to acuminate apex.

Female. Differs from male only in both pygidium and hypopygidium widely rounded at apex, and also somewhat shorter antennae or at least shorter scape, clearly explanate elytral sides and narrower protarsi. Ovipositor moderately pigmented, its gonocoxites moderately long (about twice as long as valvifer), with simple apex and moderately long styli.

Variations and sexual dimorphism. Length of body 3.6–5.5 mm long 1.8–2.7 mm wide. The sexual dimorphism in shape of sclerites of ultimate abdominal segment and protarsi is rather stable. The coloration, puncturation, pubescence and microsculpture of integument show some variability.

Diagnosis. See the diagnosis of *M. gigas* sp. nov. Besides, this new species is with very sparse puncturation on the metasternum, subrectinearly convergent antennal and subparamental grooves and without any transverse (“fronto-clypeal”) line at the bottom of depression between antennal insertions.

Etymology. Epitet of this new species is devoted to A. NEL from MNHN, who made different and very valuable assistance to the authors during their study.

***Mystrops pulchra* sp. nov.**

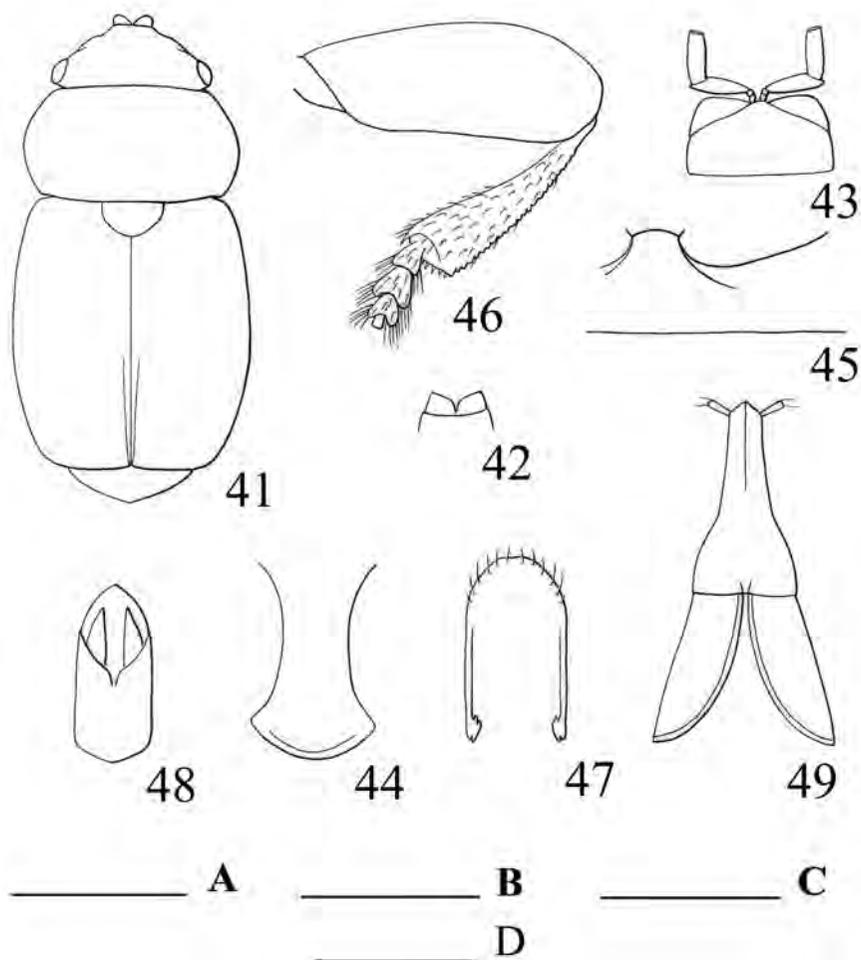
(Figs. 41–49; 54H, 54I)

Material. Holotype (MNHN), male and 134 paratypes (BMNH, MNHN, NMP, NMW, NRS, SMNS, UNAM, MZSP, ZIN, ZMB) – “Peru-Amazonas, Loc. Ocol./Molinopampa, 20-IX-2007; G. Couturier, C. Delgado and K. Mejia”, “S 06°15'48"; W 77°34'41", 2370 msnm, inflorescence ♂ *Ceroxylon quindiuense*, Arecaceae”.

Description of holotype (male). Length of body 1.6, width 1.2, height 0.6 mm. Elongate oval, rather convex dorsally and ventrally; black with reddish mentum, appendages and abdominal apex (although antennal clubs dark brown); dorsum and underside with slight oily shine and on elytra a slight bronze tint; dorsum with rather conspicuous and subrecumbent yellowish golden hairs somewhat longer than distance between their insertions; underside with finer, shorter, less conspicuous and recumbent hairs; lateral edges of pronotum and elytra not fringed, at posterior pronotal angles without clear “false angles” forming by longer hairs projecting posteriorly.

Head and pronotum with small and shallow punctures (about as large as eye facets), interspaces between them about a puncture diameter, with very dense and fine cellular microreticulation. Elytra and pygidium with somewhat puncturation and sculpture somewhat similar to those on head and pronotum, but punctures somewhat sparser and interspaces between them somewhat more smooth. Underside of head and prosternum with not clear punctures, with very dense and very course microreticulation. Metaventre with punctures somewhat smaller than eye facets, interspaces between them 2–3 puncture diameters and about as microreticulated as head and pronotum. Abdominal ventrites with puncturation and sculpture about as those on head and pronotum, but with larger punctures and more coarse microreticulations on interspaces between them.

Head markedly shorter than distance between eyes, slightly convex at base, without transverse (“fronto-clypeal”) line, but with a shallow depression between antennal insertions, lateral edges above insertions of antennae moderately elevated, anterior edge of frons not clearly bordered and somewhat emarginate; eyes comparatively small and very finely faceted; temples absent. Labrum with moderately projecting lobes (about 1/4 as long as wide), separately obliquely abrupt, with a deep and wide V-shaped median excision. Mandibles moderately exposed from under frons. Antennae about 1.5 times as long as the head width across eyes; scape nearly twice as long as wide and slightly shorter than club, somewhat thicker than subcylindrical to slightly subconical flagellomeres; antennomeres 2 and 3 subequal in length and shape, antennomere 4 somewhat shorter and antennomere 5 longest among flagellomeres, antennomeres 6–8 shorter than the rest; club comprising less than 1/4 of total antennal length, rather elongate and almost symmetrical,



Figs. 41–49. *Mystrops pulchra* sp. nov. — 41–48, Male; 49, female. — 41, Body, dorsal; 42, anterior part of head with labrum, anterodorsal; 43, mentum with labial palpi, ventral; 44, prosternal process, ventral; 45, left part abdominal ventrite 1 with submetacoxal line, ventral; 46, anterior leg, dorsal; 47, tegmen, ventral; 48, penis trunk, dorsal; 49, ovipositor, ventral. Scales: A to fig. 41, bar 1.0 mm; B to fig. 42, bar 1.0 mm; C to figs. 43–46, bar 0.5 mm; D to figs. 47–49, bar 0.25 mm.

with longest subtriangular antennomere 9, antennomere 10 transverse and about $\frac{2}{3}$ as long as antennomere 9; ultimate antennomere shortest and somewhat incerted inside previous one; antennomeres with moderately long and sparse setae. Pronotum widest at the middle, almost twice as wide as long; its anterior edge weakly emarginate and posterior edge slightly convex, not bordered; sides rather arcuate, extremely narrowly canalicular; anterior and posterior angles widely rounded; disk rather convex. Scutellum large, subtriangular and with subrounded apex. Elytra widest in the middle, about $1\frac{2}{9}$ as long as wide combined, separately rounded at apex and leaving uncovered the most part of pygidium; their lateral edges very broadly arcuate, not explanate, just visible simultaneously from above, adsutural lines expressed in distal $\frac{2}{5}$. Pygidium slightly

convex and very widely rounded to subtruncate at apex. Widely subtruncate and convex apex of anal sclerite clearly exposed.

Mentum about twice as wide as long, only slightly narrowing anteriorly and shallowly excised at anterior edge, its anterior angles somewhat projecting anteriorly. Ultimate maxillary palpomere subcylindrical to slightly narrowing apically, more than 6.0 times as long as thick. Ultimate labial palpomere oval to subcylindrical to slightly narrowing apically, about 3.5 times as long as thick. Antennal grooves not expressed and subparamental grooves very slightly expressed, subparallel. Prosternum with a strong median convexity before the prosternal process, which is medially subflattened and roof-like at apex, scarcely curved along coxae, its apex rather widened before arrow-like posterior edge, with maximum width markedly more than width of antennal club and with distinct outer angles. Ratio of distances between pro-, meso- and metacoxae about as 1.0 : 1.5 : 3.0. Metaventricle medially depressed and with a clear median line, its posterior edge between coxae very shallowly angularly excised. Submetacoxal line very distinct, but not reaching posterior edge of abdominal ventrite 1. Abdominal ventrite 1 about twice as long as hypopygidium and somewhat longer than ventrites 2–4 combined; hypopygidium widely arcuate at posterior edge. Epipleura at base rather narrower than antennal club, strongly elevated laterally.

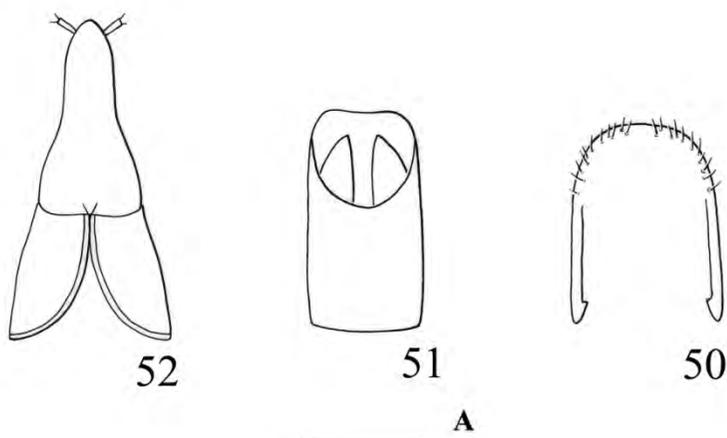
Tibiae moderately widened, all with almost straight inner edge and comparable in width at apex (about as wide as antennal club), widest before apex, outer subapical angle of all tibiae not projecting and more or less oblique, outer edge of meso- and metatibiae with rows of extremely short and fine setae. Femora almost of usual shape, all with almost straight posterior edges, pro- and metafemora somewhat about 1.5 times, mesofemur about twice as wide as corresponding tibiae. Tarsi of usual structure; protarsus about 2/3 as wide as tibiae, meso- and metatarsi somewhat narrower; claws simple.

Aedeagus moderately sclerotized; tegmen subparallel-sided in basal 3/4 and almost gradually narrowing to arcuate apex with short hairs; penis trunk about as long as tegmen, subparallel-sided in basal 2/3 and gradually narrowing to subacuminate apex.

Female. Differs from male in both pygidium and hypopygidium widely rounded at apex, and also more or less shorter antennae, slightly overpassing behind pronotal base, narrower head and pronotum. Ovipositor weakly pigmented, its gonocoxites moderately long (a little longer than valvifer) with simple apex and moderately long styli.

Variations and sexual dimorphism. Length of body 1.7–2.7 mm, width 0.8–1.4 mm. All specimens examined have black body. Some males bear rather long antennae (about 2.5 times as long as head wide) reaching the elytral distal 1/3. The median convexity of male prosternum is rather variable and in some males it is almost not raised. The puncturation, pubescence and microsculpture of integument show some variability.

Diagnosis. This new species is characterized with the strongly elevated epipleura, median convexity in the middle of the male prosternum. These characters, in addition to its quite peculiar coloration and antennal structures, make possible easily to distinguish this new species among the congeners. This new species is more similar to *M. adustus* MURRAY, 1864, but differs from it, except strongly elevated epipleura and convexity on male prosternum, in the more convex and more slender body, much denser and darker dorsal pubescence, peculiarities of structure of antennae, not explanate pronotal sides, shorter adsutural lines, not distinct antennal grooves and so on. It also shares some similarity with *M. dufau* GROUVELLE, 1912, differing from the latter, except strongly elevated epipleura and convexity on male prosternum, in the more dark, slender and more



Figs. 50–52. *Mystrops rotundula*, male (50–51) and female (52). — 50, Tegmen, ventral; 51, penis trunk, dorsal; 52, ovipositor, ventral. Scale: A to figs. 50–52, bar 0.25 mm.

convex body, and also shorter labral lobes, narrowing pronotal base, wider prosternal process, far deviating submetacoxal lines, wider tibiae and other characters.

Etymology. Epitet of this new species means “beautiful”, “good-looking”.

Mystrops rotundula SHARP, 1889

(Figs. 50–52; 54F, 54G)

Material. 169 specimens (BMNH, MNHN, MZSP, NMP, NMW, NRS, SMNS, UNAM, ZIN, ZMB) – “Peru-Amazonas, Loc. Ocol./Molinopampa, 20-IX-2007; G. Couturier, C. Delgado and K. Mejia”, “S 06°15'48”; W 77°34'41”, 2370 msnm, inflorescence ♂ *Ceroxylon quindiuense*, Arecaceae”.

Notes. The specimens examined from Peru are somewhat smaller (2.0–2.9 mm) than specimens from Ecuador (NMW, SMNS, ZIN, ZMB) and Panama (BMNH, NMP). They have also more sparse puncturation and more relief microreticulation on pronotum.

Discussion

Six species of *Mystropini* studied here have been never found on palms spread in Amazonia (KIREJTSHUK and COUTURIER, in press). Their ranges seem to be limited only by the Andes. However *Mystrops rotundula* has a somewhat larger distribution in South and Central America (Peru, Panama, Ecuador). The result of this study is in accordance with conclusions by KIREJTSHUK and COUTURIER (in press) on *Mystropini* specificity in relation of host plants.

Acknowledgements

The authors thanks C. DELGADO and K. MEJIA (Instituto de Investigaciones de la Amazonia Peruana, Iquitos, Peru - IIAP) for their help in the field work with the second author; K. MEJIA, botanist, identified the species of the palm. The authors received a considerable assistance in preparation of drawings from G. HODEBERT artist of MNHN, A.



A



B

Fig. 53. Male specimen of *Ceroxylon quindiuense*. A, Specimen along road Chachapoyas to Mendoza, locality Ocol (collector is climbing on the stipe to cut inflorescence); B, part of a male inflorescence.

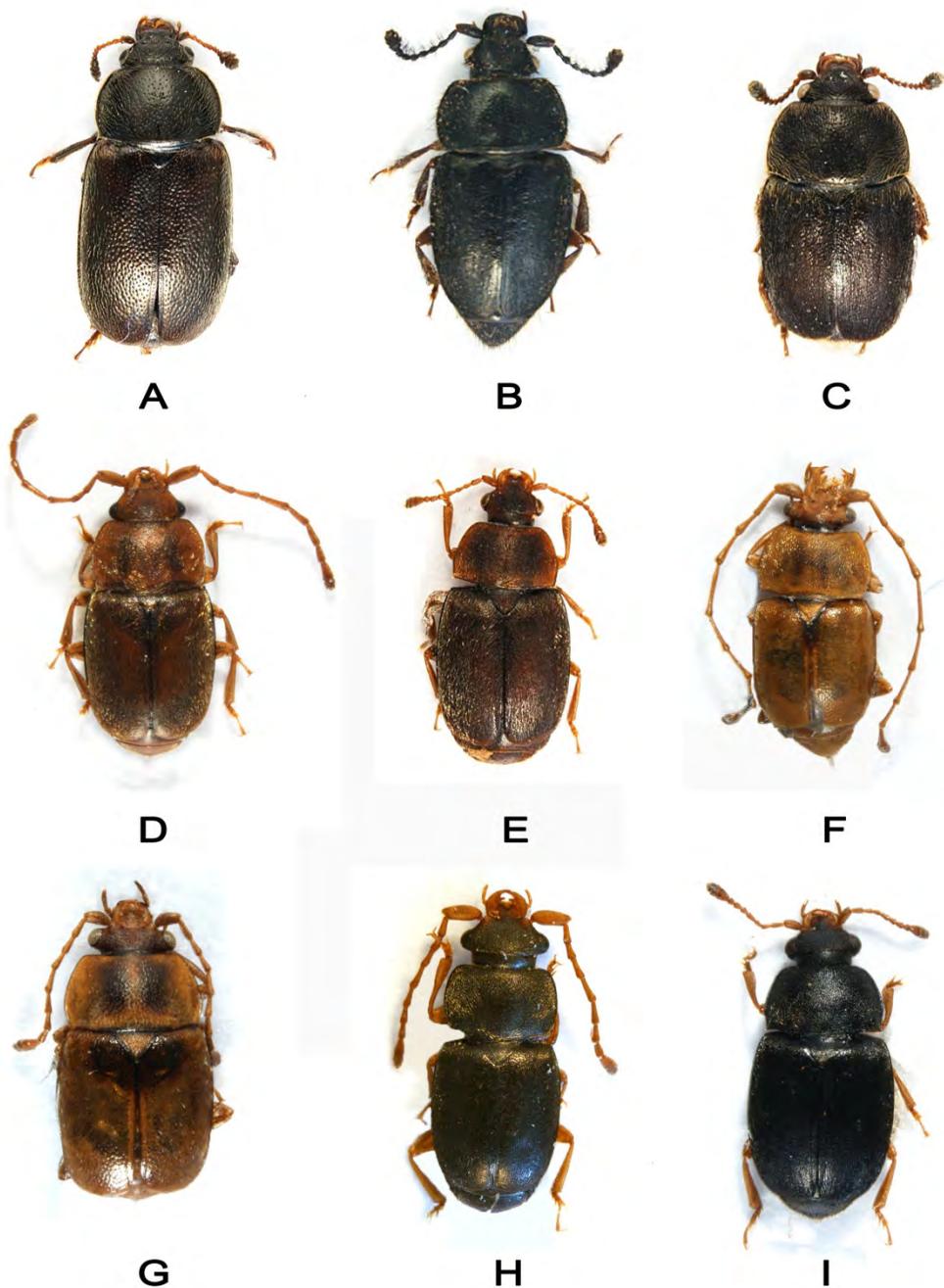


Fig. 54. Species of the genus *Mystrops*. — A, ♂ of *M. gigas* sp. nov.; B, ♂ of *M. neli* sp. nov.; C, ♂ of *M. hisamatsui* sp. nov.; D, ♂ of *M. delgadoi* sp. nov.; E, ♀ of *M. delgadoi* sp. nov.; F, ♂ of *M. rotundula*; G, ♀ of *M. rotundula*; H, ♂ of *M. pulchra* sp. nov.; I, ♀ of *M. pulchra* sp. nov.

AING, photograph of the Institut de Research pour le Development (MNHN, IRD), for the numerical treatment of the plates and C. PIERRE (MNHN) that initiate us to the use of Nikon camera. The authors particularly appreciate to A. NEL (MNHN) who encouraged this work and made different assistance for this study. The field work in Peru has been supported by the IIAP (“Programa de Biodiversidad”). Work of the senior author was supported also by the programme “Origin and Evolution of Biosphere” of the Presidium of the Russian Academy of Sciences and the administration of Museum National d’Histoire Naturelle (Paris), invited him to study the collection of this museum during 2006–2009. This study was also supported by grants of Russian Foundation of Basic Research (N 07-04-00540-a and 09-04-00789-a).

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