

**MORE NEW SPECIES OF *CYCLOCEPHALA* DEJEAN, 1821 FROM SOUTH AMERICA
(SCARABAEIDAE: DYNASTINAE: CYCLOCEPHALINI)**

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Abstract

Cyclocephala acoma Ratcliffe (Bolivia), *C. carlsoni* Ratcliffe (French Guiana), *C. chera* Ratcliffe (Guyana), *C. chiquitita* Ratcliffe (Ecuador), *C. compacta* Ratcliffe (Brazil), *C. hielkemaorum* Ratcliffe (French Guiana), *C. melanopoda* Ratcliffe (Ecuador), *C. monacha* Ratcliffe (Colombia), *C. perplexa* Ratcliffe (Bolivia), and *C. saltini* Ratcliffe (Peru) are described as new species. A description, diagnosis, and illustrations are provided for each new species.

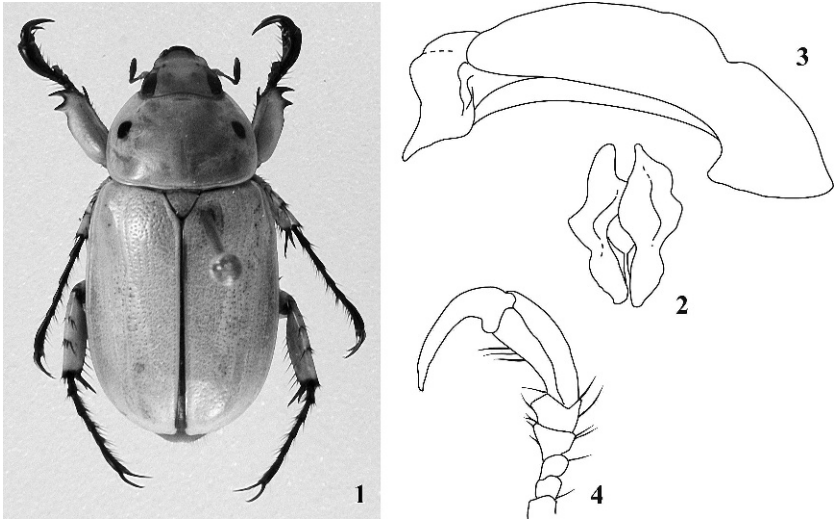
*The beginning of wisdom is to call
things by their right names.*

— Chinese Proverb

Cyclocephala Dejean, 1821 is a large genus that currently contains about 335 species, although new species are being described continuously. *Cyclocephala* species occur from southeastern Canada south to Argentina and in the West Indies. Most species occur in the Neotropical realm. Endrödi (1985) provided the most recent synopsis of the genus, although 90 species have been described since his work. Consequently, the keys in his manual should be used with caution inasmuch as there now exists 44% more species than are in the keys.

Species in the genus may be recognized by a clypeus with sides slightly to distinctly converging to a rounded, parabolic, subtruncate, or emarginate apex; antenna with 8–10 segments (9 or 10 in the Central American species) and the club longer in the males of a few species; maxilla armed with distinct teeth; and protarsus in the males distinctly enlarged with the median (or inner) claw much larger than the outer claw (claws in females are simple). Distinguishing the genus *Cyclocephala* from other genera of Cyclocephalini may occasionally be difficult. *Aspidolea* species most closely resemble *Cyclocephala* species, but in *Aspidolea* species the sides of the clypeus are always divergent (sometimes only weakly) from the base before becoming rounded at the apex, whereas in *Cyclocephala* species the sides of the clypeus converge (even if slightly) to the apex. A more reliable character is the presence of distinct teeth on the maxilla in *Cyclocephala* species, whereas they are absent in *Aspidolea* species, except for the large and distinctive *A. fuliginea* (Burmeister). *Cyclocephala* species do not have the elongated mandible seen in most *Ancognatha* species, and they also have a more or less complete frontoclypeal suture, which is obsolete medially in *Ancognatha* species.

Adult *Cyclocephala* species are nocturnal, and they are attracted to lights at night. Several species are important, accidental pollinators of palms and aroids resulting from their feeding on floral parts (Young 1986; Gottsberger 1989;



Figs. 1–4. *Cyclocephala acoma*: 1) dorsal view of paratype; 2–3) parameres (caudal and lateral views); 4) right protarsus, median view.

Gottsberger and Silberbauer-Gottsberger 1991). Only a few larvae have been described (mostly temperate species), and those feed on the roots of grasses.

Methods

In this paper I adhere to the phylogenetic species concept as outlined by Wheeler and Platnick (2000). This concept defines species as the smallest aggregation of populations diagnosable by a unique combination of character states. Not all species are equally diagnosable. Some are easily recognized by examining one individual with a unique set of characters (*e.g.*, the new species described herein), and some must be proposed only after many individuals from different populations are examined.

A note on the specimen labels as quoted in this paper is warranted. Label data are quoted verbatim and in quotation marks, although a comma is used to separate lines on a label. Since some specimens have more than one label, a double slashed line (//) indicates the separation between two different labels.

The parameres of male *Cyclocephala* species are diagnostic, and so they are figured wherever possible. The presence of a dotted line on a figure of the parameres indicates non-sclerotized tissue; this is especially evident in lateral views.

Cyclocephala acoma Ratcliffe, new species

(Figs. 1–4)

Type Material. Holotype male, labeled “BOLIVIA; Santa Cruz, Amboro National Park, Los Volcanes, c.1,000 m, S18°06';W63°36', 20/xi-12/xii-2004//MV light sheet, on stream beach, Barclay, M.V.L. & Mendel, H., BMNH (E) 2004-280,” and my red holotype label. Allotype female with same data and my red allotype label. Four males and two females with same data and my yellow paratype labels. Two males and three females labeled “BOLIVIA: Dep. Santa

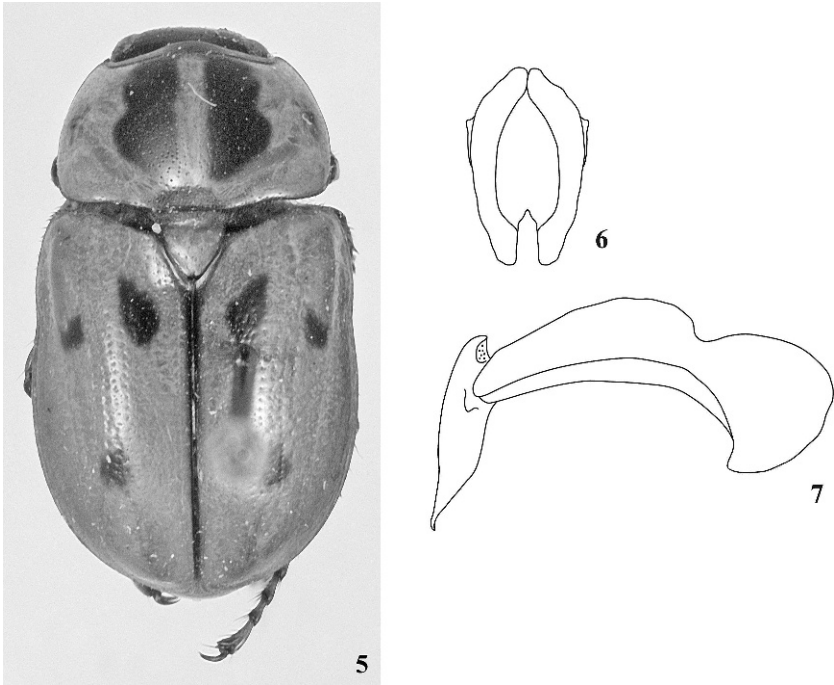
Cruz, Bermejo, Refugio Los Volcanes, Stream next to Research Station, 18°06'41 (sic) S63°36'05"W, 22.xi.2003, @ blue light trap, coll. D.J.Mann & A.C.Hamel//OUMNH-2004-005, D.J.Mann & A.C.Hamel coll., Pres. Mann & Hamel, 2004," and with my yellow paratype labels. Three males and three females with same data except date of 22-xi-2003. One male and one female labeled "BOLIVIA: Dep. Santa Cruz, Bermejo, Refugio Los Volcanes, Humid Forest, 1,080 alt, 18°06'S63°36'0 (sic) W, 24.xi.2003, @ blue light along forest path, coll. D.J.Mann & A.C.Hamel//OUMNH-2004-005, D.J.Mann & C.Hamel coll., Pres. Mann & Hamel, 2004," and with my yellow paratype labels. Two additional male paratypes with same data but with date of 22-xi-2003 and 26-xi-2003, respectively.

Holotype, allotype, and two paratypes deposited at the Natural History Museum (BMNH), London, United Kingdom. Two paratypes at the University of Nebraska State Museum, Lincoln, NE; seven paratypes at the Museo de Historia Natural (Colección Boliviana de Fauna), La Paz, Bolivia; four paratypes at the Oxford University Museum of Natural History, Oxford, United Kingdom; two paratypes at the U.S. National Museum, Washington, D. C.; and four paratypes in the B. C. Ratcliffe Collection, Lincoln, NE.

Holotype. Male. Length 13.8 mm; width across humeri 6.9 mm. Color of dorsum pale testaceous except for small, round, black spot near lateral margin of pronotum, scutellar and sutural margins narrowly brown, and pygidium and venter reddish brown; tarsi and apices of femora black. *Head:* Surface glabrous. Occiput sparsely punctate, punctures small. Frons densely punctate, becoming rugulopunctate towards frontoclypeal suture, punctures small and minute mixed. Frontoclypeal suture distinct, arcuate. Clypeus with surface entirely rugulopunctate; apex evenly rounded into a semicircle, reflexed slightly higher than sides. Interocular width equals 3.0 transverse eye diameters. Antenna with 10 segments, club 3-segmented and subequal in length to segments 2–7. *Pronotum:* Surface glabrous, moderately densely punctate, punctures small. Base with complete marginal bead. Posterior angles broadly rounded. *Elytra:* Surface glabrous, finely shagreened, densely punctate; punctures moderately large, shallow, some in rows (striae). *Pygidium:* Surface (except apex) opaque, coarsely roughened, setigerous; setae dense, moderately long, reddish brown. Apex shining, densely rugulopunctate, punctures small, setae absent. In lateral view, surface weakly convex in basal half, strongly convex in apical half. *Legs:* Protibia bidentate and with swelling where third, basal tooth would have been. Protarsus (Fig. 4) strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 5th longer than tarsomeres 1–4, arcuate, carinate on medioventral edge, venter with row of stout, black bristles. Median claw enlarged (about 3 times thickness of smaller claw), strongly curved, apex entire. Metatarsus slightly longer than twice length of metafemur. Meso- and metatarsal claws long, slender, more than half length of tarsomere 5. *Venter:* Prosternal process very short, subtriangular. Metasternum glabrous. *Parameres:* Figs. 2–3.

Allotype. Female. Length 14.6 mm; width across humeri 7.7 mm. As holotype except in the following respects: *Elytra:* Epipleuron (ventral view) broad for its entire length, abruptly terminating in a right angle at level of sternite 5. In dorsal view, lateral margin slightly swollen laterad of apical umbone, swelling black. *Pygidium:* Surface densely, finely rugulopunctate, glabrous. In lateral view, surface weakly convex. *Legs:* Protibia tridentate, teeth subequally spaced. Protarsus normal, not enlarged. Metatarsus only slightly longer than metatibia.

Variation. Males (12 paratypes). Length 13.2–15.5 mm; width across humeri 6.8–7.4 mm. The paratypes do not differ significantly from the holotype, except that the sutural line varies from brown to piceous to black.



Figs. 5–7. *Cyclocephala carlsoni*: 5) dorsal view of holotype; 6–7) parameres (caudal and lateral views).

Females (9 paratypes). Length 13.8–14.3 mm; width across humeri 6.9–7.5 mm. The paratypes do not differ significantly from the allotype, except that the color of the subapical swelling of the elytra and the sutural line varies from brown to piceous to black

Etymology. This species is remarkably glabrous, or without setae. Accordingly, I have named it *acoma* from the Greek *akomos*, meaning bald or without hair.

Distribution. *Cyclocephala acoma* is known only from the type locality at the Los Volcanes Research Station in Parque Nacional Amoro in the province of Santa Cruz on the eastern slopes of the Andes.

Diagnosis. *Cyclocephala acoma* will key only to couplet 173 in the male key in Endrödi (1985), where the key no longer fits any of the characters. The asymmetrical male parameres are unique among *Cyclocephala* species. Only the parameres of *C. cartwrighti* Endrödi, also from Bolivia, approach those of *C. acoma*, but *C. cartwrighti* is setose on the head and pronotum and has more black markings on both the head and pronotum. The male parameres of both species are also different.

***Cyclocephala carlsoni* Ratcliffe, new species**

(Figs. 5–7)

Type Material. Holotype male, labeled “GUYANE, Rue de Regina, 40 km S Cayenne, 23 Sept. 1992, bl&mv, DCCarlson, FTHovore, PHSullivan collectors.”

Allotype female labeled "GUYANE, Piste de Coralie, Pk 2, 27 Sept. 1992, BL&MN, DCCarlson, FTHovore, PHSullivan collectors." One male and one female paratype labeled "FRENCH GUIANA, PK 15/15 Piste de Belizon, IX-18-2004, R. Rojkoff."

Holotype and allotype (property of David Carlson, Fair Oaks, CA) deposited at the University of Nebraska State Museum, Lincoln, NE. Two paratypes deposited in the B. C. Ratcliffe collection (Lincoln NE).

Holotype. Male. Length 10.0 mm; width across humeri 5.2 mm. Color testaceous except for black frons, 2 broad, longitudinal bands on pronotum, posterior borders of scutellum and elytral suture, 3 black spots on each elytron (post-humeral, post-scutellar, center of disc behind middle; and apices of femora, tibiae, and protibial teeth). Tarsi, pygidium, abdominal sternites light yellowish brown. *Head:* Surface of frons densely punctate, punctures small. Clypeus vaguely roughened or rugulopunctate; apex broadly truncate, feebly emarginate at middle, weakly reflexed. Frontoclypeal suture biarcuate, distinct. Interocular width equals 3.4 transverse eye diameters. Antenna 10-segmented, club subequal in length to segments 2–7. *Pronotum:* Surface moderately densely punctate, punctures small. Posterior angles broadly rounded. Base lacking marginal bead. *Elytra:* Surface weakly shagreened, punctate; punctures minute and moderately large mixed, paired punctate striae indistinct. *Pygidium:* Surface densely punctate; punctures minute, surface becoming rugulose in angles. In lateral view, surface evenly convex. *Legs:* Protibia tridentate, basal tooth small, slightly removed from other teeth. Protarsus strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 5th subequal in length to tarsomeres 2–4; median claw enlarged, strongly curved, apex widely split into broad and small rami. Posterior tibia short, stout, expanded towards apex; apex with fringe of short, stout spinules. Metatarsus subequal in length to metatibia. *Venter:* Prosternal process long, slender, columnar, apex a small, oval disc with raised, transversely oval "button" on anterior 2/3. *Parameres:* Figs. 6–7.

Allotype. Female. Length 10.0 mm; width across humeri 5.4 mm. As holotype except in the following respects: Color and pattern similar except pronotum with small, black spot near lateral margin on each side and subapical swelling of elytral margin piceous. *Head:* Entire surface punctate to rugopunctate, punctures moderate in size. Interocular width equals 2.1 transverse eye diameters. *Elytra:* Epipleuron (in ventral view) attenuated at level of sternite 4. Elytral margin laterad of apical umbone swollen into weak knob. *Pygidium:* In lateral view, surface weakly convex. *Legs:* Protibia with teeth subequally spaced. Protarsus simple, not enlarged.

Variation. Males (1 paratype). Length 9.3 mm; width across humeri 5.2 mm. As holotype except in the following respects: Head and pronotum with punctures dense, moderately large. Clypeus rugulose. Elytra with discal spot absent.

Females (1 paratype). Length 10.3 mm; width across humeri 5.6 mm. Head with clypeus transversely rugose.

Etymology. The species is named in honor of David Carlson (Fair Oaks, CA), one of the collectors of this new species, who has loaned me numerous specimens for study over the years. This patronym is also crafted in grateful appreciation of his permission for allowing type specimens from his personal collection to be deposited in the collection of the University of Nebraska State Museum.

Distribution. *Cyclocephala carlsoni* is endemic to French Guiana, and all the specimens were taken from lowland rainforest.

Diagnosis. *Cyclocephala carlsoni* males will key as far as couplet 353 in Endrödi (1985), at which point no other choices apply. The female allotype will key as far

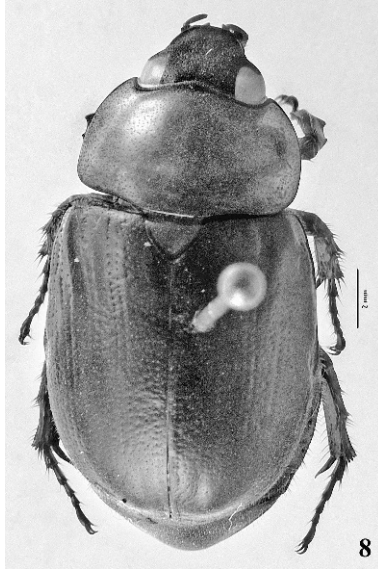


Fig. 8. *Cyclocephala chera*, dorsal view of paratype.

as couplet 261, where choices no longer fit. While this species has similar color and pattern to other species of *Cyclocephala*, it is the combination of these characters (and others mentioned in the description) with its small size that makes this species distinctive. I have examined the literature for all of the new species of *Cyclocephala* described since Endrödi (1985), particularly those from French Guiana by Roger-Paul Dechambre, and none of them correspond with the combination of character states of *C. carlsoni*.

***Cyclocephala chera* Ratcliffe, new species**
(Fig. 8)

Type Material. Holotype female, labeled "GUYANA: White Water Cmp., Burra Burra (sic) R. Iwokrama Res., 250–300 m, 16.II.02, 4°40'31"N/58°40'59"W, Davis, Pogue & Solis." Five paratypes with same data; three paratypes with same data but with date of 15.II.02, and one paratype with same data but with date of 14.II.02.

Holotype and three paratypes deposited at the U. S. National Museum, Washington, D. C.; two paratypes deposited at the University of Nebraska State Museum, Lincoln, NE; four paratypes placed in the Brett C. Ratcliffe Collection (Lincoln, NE).

Holotype. Female. Length 15.2 mm; width across humeri 9.1 mm. Color of clypeus, tibiae, pygidium, and venter dark brown; pronotum, scutellum, and femora light orange; frons black with small, orangish subtriangular spot at center apex; elytra black and weakly suffused with dark orange on disc behind humeri. *Head:* Frons with moderately dense, moderately large punctures. Frontoclypeal suture biarcuate, distinct. Clypeus with surface roughened, vaguely rugopunctate; apex semicircular with thin, marginal bead. Interocular width equals 2.7

transverse eye diameters. Antenna 10-segmented, club slightly longer than segments 2–7. *Pronotum*: Surface weakly shagreened, punctate; punctures moderate in density and size. Base without marginal bead. Posterior angles broadly rounded. *Elytra*: Surface weakly shagreened, punctate; punctures large, dense, double rows of punctate striae distinct. Apical angles with sparse, minute setae. *Pygidium*: Surface vaguely shagreened, punctate; punctures small, moderate in density, setigerous; setae minute, tawny. In lateral view, surface weakly convex. *Legs*: Protibia tridentate, basal tooth small and strongly removed from apical teeth. Protarsus simple. Metatarsus subequal in length to metatibia. *Venter*: Prosternal process long, columnar, apex transversely oval and flat with a raised, transverse “button” on anterior half.

Variation. Females (9 paratypes). Length 13.9–14.8 mm; width across humeri 7.6–8.5 mm. The paratypes do not differ significantly from the holotype except that the pronotal punctures become denser on the sides in some specimens.

Etymology. The specific epithet is the Greek word *chera*, meaning a widow and is used here as a noun in apposition in reference to the type series of females only.

Distribution. *Cyclocephala chera* is known only from Guyana. The specimens were taken in lowland rainforest at the Iwokrama Field Station along the Burroburro River nearly in the middle of the country at its narrowest point.

Diagnosis. Normally, I am hesitant to describe a new species of *Cyclocephala* based upon females only, because it is usually the male characters of enlarged protarsi, protibial teeth, pygidium, and parameres that provide the most reliable features for distinguishing species. I make an exception in this case because (1) the body form and coloration are so distinctive, (2) it will not key out in Endrödi (1985) nor is it described in any new species descriptions that have appeared since Endrödi (1985), and (3) I have not seen anything like it in any collection.

The broadly oval and vaulted body form most closely resembles *C. conspicua* Sharp and *C. gregaria* Heyne and Taschenberg. In those species, however, the elytral margin is thickened into a distinct swelling or flange, whereas the margin in *C. chera* is imperceptibly thickened. Moreover, those species have characteristic black patterns on the pronotum and/or elytra, whereas *C. chera* does not. The darkest and relatively uncommon forms of *C. complanata* Burmeister resemble the color in *C. chera*, but *C. complanata* has the base of the pronotum with a marginal bead, has a more slender body form, and occurs only in Mesoamerica. In short, I know of nothing else like *C. chera*. In Endrödi (1985), it will key on so far as couplet 382 in the female key, and then no other choices fit.

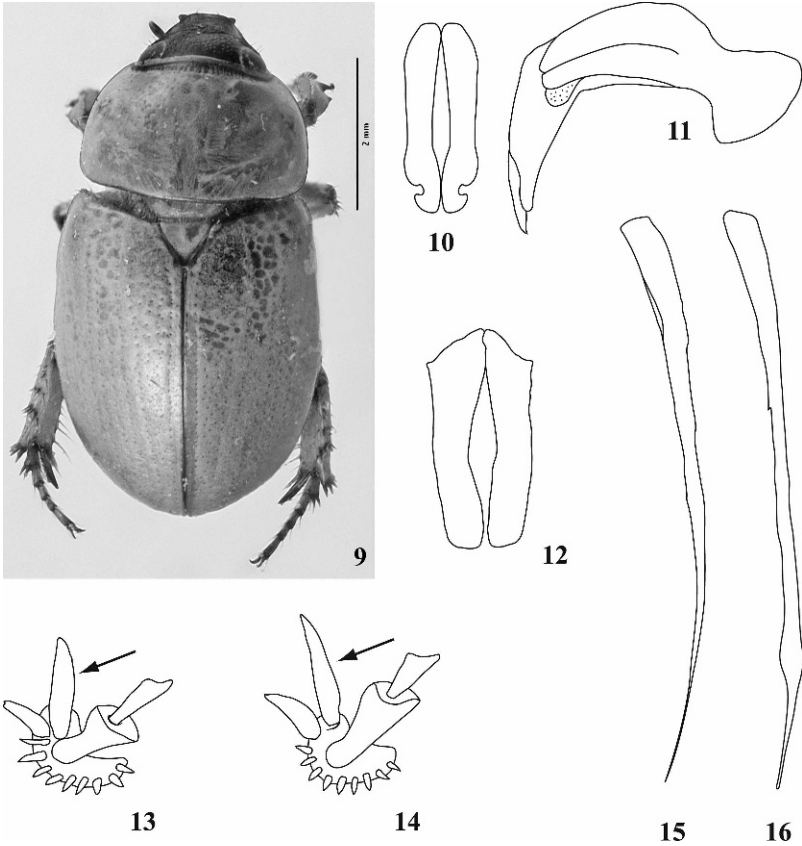
Cyclocephala chiquitita Ratcliffe, new species

(Figs. 9–11, 13, 15)

Type Material. Holotype male, labeled “ECUADOR, Napo Pr., Res. Biol. Yasuni, 6–7 September 1998, FTHovore/RLPenrose//D. C. Carlson Collection, Gift from: F. T. Hovore.” Allotype female, two male paratypes, and one female paratype with same data.

Holotype and allotype (property of David Carlson, Fair Oaks, CA) deposited at the University of Nebraska State Museum, Lincoln, NE. One male paratype in the David Carlson Collection (Fair Oaks, CA) and a male/female pair in the Brett Ratcliffe Collection (Lincoln, NE).

Holotype. Male. Length 6.6 mm; width across humeri 3.7 mm. Color testaceous except for black frons and yellowish brown clypeus, pygidium, apices of protibial teeth, tarsomeres, and abdominal sternites. *Head*: Surface of frons minutely



Figs. 9–16. *Cyclocephala chiquitita*: **9)** dorsal view of holotype; **10–11)** parameres (caudal and lateral views); **12)** parameres of *C. ovulum*; **13–14)** apex of right metatibia showing **13)** thick spur in *C. chiquitita* and **14)** more slender spur in *C. ovulum*; **15–16)** left epipleuron (ventral view) of female of **15)** *C. chiquitita* and **16)** *C. ovulum*.

shagreened, punctate; punctures moderately dense, moderately large. Clypeus vaguely rugopunctate; apex broadly truncate, weakly reflexed. Interocular width equals 3.0 transverse eye diameters. Antenna 10-segmented, club subequal in length to segments 2–7. *Pronotum*: Surface weakly shagreened, punctate; punctures moderately large (similar to those on frons), moderate in density. Posterior angles broadly rounded. Base without marginal bead. *Elytra*: Surface minutely shagreened, punctate; punctures moderately dense, moderately large (slightly larger than those on pronotum); 3 pair of punctate striae barely evident. *Pygidium*: Surface shagreened, glabrous, densely rugulopunctate. In lateral view, basal 2/3 nearly flat, apical third weakly convex. *Legs*: Protibia tridentate, teeth subequally spaced, basal tooth obliquely truncate. Protarsus strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 5th subequal in length to tarsomeres 1–3 only; median claw enlarged, strongly curved, apex narrowly split into large and small rami. Posterior tibia stout, expanded towards apex; apex with fringe of short, stout spinules. Metatarsus subequal in length to metatibia. *Venter*: Prosternal process

moderate in length, apex transversely oval with raised, subtriangular "button" on anterior half. *Parameres*: Figs. 10–11.

Allotype. Female. Length 6.7 mm; width across humeri 3.8 mm. As holotype except in the following respects: Color of pygidium testaceous (not yellowish brown). *Elytra*: Epipleuron (in ventral view) gradually tapering towards apex (Fig. 15). *Pygidium*: In lateral view, surface nearly flat. *Legs*: Protarsus simple, not enlarged.

Variation. Males (2 paratypes). Length 6.4–6.8 mm; width across humeri 3.9–4.0 mm. The male paratypes do not differ significantly from the holotype.

Females (1 paratype). Length 7.0 mm; width across humeri 3.7 mm. The single female paratype does not differ significantly from the allotype.

Etymology. The specific epithet is from the Spanish diminutive, *chiquitita*, meaning very small. It agrees in gender with the generic name.

Distribution. *Cyclocephala chiquitita* is endemic to the Yasuni Biological Station on the Tiputini River in Parque Nacional Yasuni in Napo Province, Ecuador. This locality is lowland tropical rainforest near the eastern slopes of the Andes at an elevation of less than 600 meters.

Diagnosis. *Cyclocephala chiquitita* resembles closely *C. ovulum* Bates, which is broadly distributed in Central and South America, including Yasuni. The parameres (Figs. 10–11) of *C. chiquitita* are unique among *Cyclocephala* species, and, on a miniature scale, they resemble more the parameres in *gestalt* of some *Stenocrates* species. The parameres of *C. ovulum* (Fig. 12) are simple and lack apical teeth. In addition, the longer spur on the apex of the metatibia of *C. chiquitita* (Fig. 13) is broad throughout most of its length, whereas this spur is slender in *C. ovulum* (Fig. 14). The females of both species are nearly identical, but the epipleuron (in ventral view) in *C. chiquitita* is gradually attenuated towards its apex (Fig. 15), but in *C. ovulum* the epipleuron is slightly enlarged and then abruptly constricted at about the level of the first sternite (Fig. 16). Males will key as far as couplet 404 in the key to males in Endrödi (1985), which is *C. ovulum*. Females will key to couplet 398 in the key to females, also *C. ovulum*.

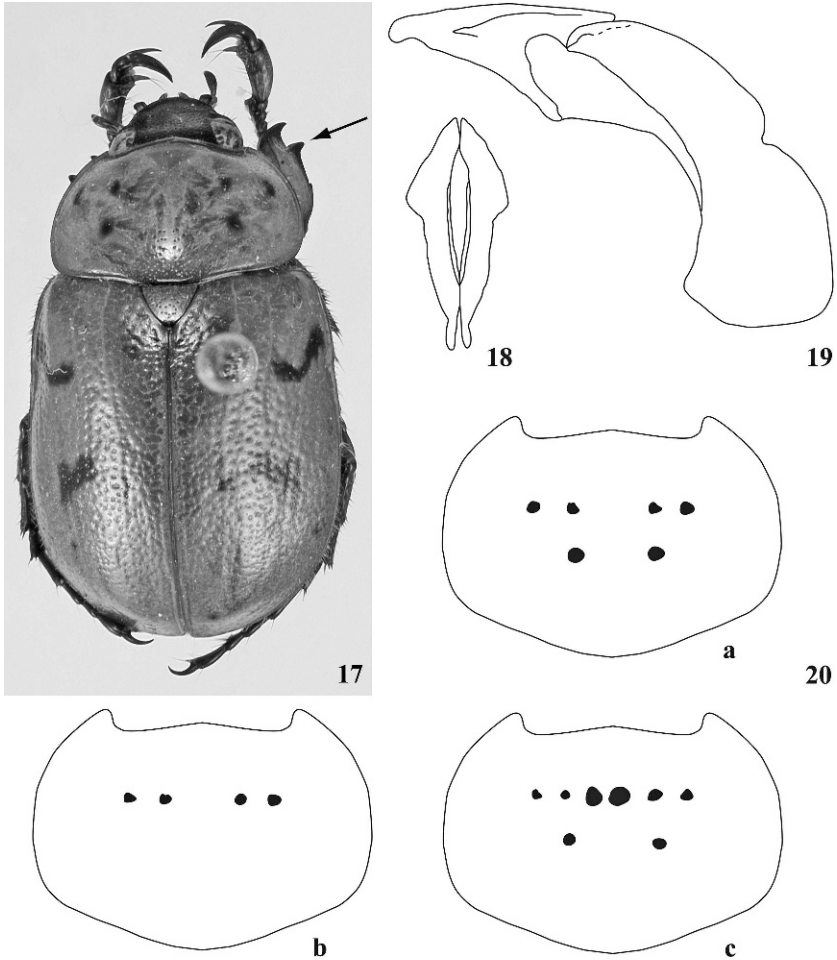
Cyclocephala compacta Ratcliffe, new species

(Figs. 17–20)

Type Material. Holotype male, labeled "BRASIL: Rondonia, 62 km S. Ariquemes, Fazenda Rancho Grande, 10°32'S, 62°49', X-5-15-1993, C. & K. Messenger." Allotype and 3 paratypes with same data. Five additional paratypes labeled "BRASIL: Rondonia, 62 km S Ariquemes, 165 m, Fazenda Rancho Grande, 10°32'S, 62°49', 19–31 Sept. 1994, coll. A. Reifschneider."

Holotype, allotype, and two paratypes deposited at the University of Nebraska State Museum, Lincoln, NE. Two paratypes deposited in the Alex Reifschneider Collection and four paratypes deposited in the B. C. Ratcliffe Collection (both Lincoln, NE).

Holotype. Male. Length 12.2 mm; width across humeri 7.2 mm. Color testaceous except for black frons; dark testaceous clypeus with black bead on apex; 6 small, black spots on pronotum (4 in transverse row and 1 each behind median spots in transverse row); elytra with curved, black macula behind humerus, short black line near middle, and small black spot mesad of black line; pygidium black either side of middle; protibial teeth black; femora and tarsi dark testaceous; meso- and metathorax and abdominal sternites piceous. *Head*: Frons with dense, moderately large punctures. Frontoclypeal suture biarcuate, distinct. Clypeus with surface vaguely, transversely rugopunctate; apex semicircular with thin, marginal bead. Interocular width equals 3.0 transverse eye diameters.



Figs. 17–20. *Cyclocephala compacta*: 17) dorsal view of holotype; 18–19) parameres (caudal and lateral views); 20) pronotum showing variation in spots.

Antenna 10-segmented, club slightly longer than segments 2–7. *Pronotum*: Surface weakly shagreened, moderately punctate at center; punctures moderately large, becoming denser on sides. Base with complete marginal bead. Posterior angles broadly rounded. *Elytra*: Surface weakly shagreened, punctate; punctures large, dense, double rows of punctate striae indistinct. Apical angles with sparse, minute setae. *Pygidium*: Surface opaque, vaguely shagreened, vaguely punctate; punctures dense, moderately large, shallow, setigerous; setae short, tawny. In lateral view, surface regularly convex. *Legs*: Protibia tridentate, basal tooth small and strongly removed from apical teeth; median tooth with anterior edge perpendicular to shaft of tibia (Fig. 17). Protarsus strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 4th with subtriangular, ventral lobe, 5th subequal in length to tarsomeres 1–4; median claw enlarged, strongly bent, apex

narrowly split into large and small rami. Metatarsus a little longer than metatibia. *Venter*: Prosternal process long, columnar, apex transversely oval and flat with a raised, transverse "button" on anterior half. *Parameres*: Figs. 18–19.

Allotype. Female. Length 11.6 mm; width across humeri 6.8 mm. As holotype except in the following respects: Color and pattern similar except pronotum with only 1 small, black spot behind each anterior angle, elytra with transverse band on disc reduced a spot, and swelling of elytral margin darkened. *Elytra*: Surface with minute setae absent from near apex. Epipleuron (in ventral view) gradually tapering towards apex, abruptly narrowed at level of sternite 1. Lateral margin slightly swollen at level of sternites 1–2. *Pygidium*: Surface shiny, punctate; punctures minute and moderately large mixed, moderate in density on disc, dense on sides, setigerous; setae sparse on sides, minute, tawny, absent elsewhere. In lateral view, surface weakly convex. *Legs*: Protarsus simple, not enlarged. Metatarsus subequal in length to metatibia.

Variation. Males (4 paratypes). Length 12.3–14.0 mm; width across humeri 7.1–7.4 mm. The paratypes do not differ significantly from the holotype except for variation in the number of spots on the pronotum: 1 as holotype, 1 lacking posterior 2 spots, and 2 with 6 spots in anterior row (Fig. 20a–c). All of the male paratypes have a black, subtriangular mark on the base of the clypeus.

Females (4 paratypes). Length 11.0–13.0 mm; width across humeri 6.6–7.4 mm. The female paratypes do not differ significantly from the allotype except for variation in the number of spots on the pronotum and elytra: 2 specimens with 4 spots in transverse row on pronotum and 2 specimens with 4 spots in transverse row on pronotum followed by 2 additional spots in second row. Two specimens with 2 discal spots instead of 1.

Etymology. The name is derived from the Latin *compactus*, meaning thick or compact, in reference to the relatively compact and stout body form of this species.

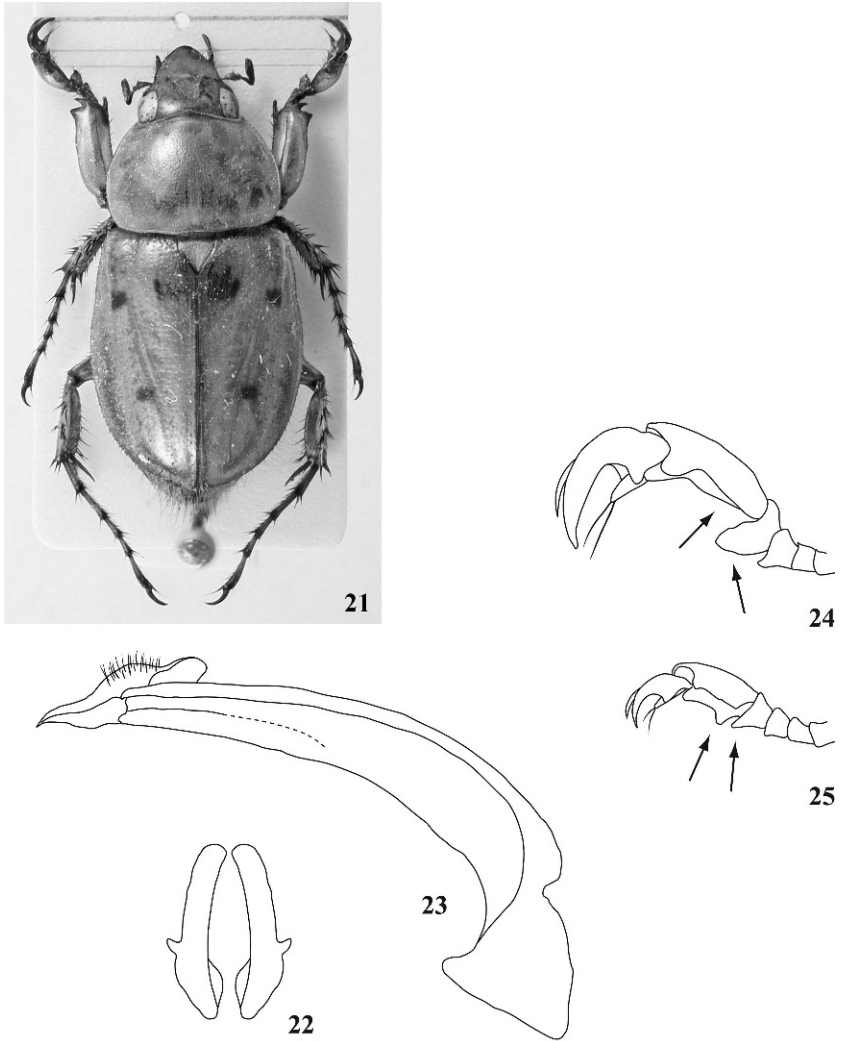
Distribution. *Cyclocephala compacta* is known from the Schmidt farm south of Ariquemes, Rondônia, Brazil. This area has been largely cut over for agriculture except for the Schmidt farm, which is now a relict island of biodiversity. Emmel and Austin (1990) reported this area had the highest species diversity of butterflies in the world, and a number of new species of scarabs (Ratcliffe 1992) have also been described from this single, rich locale.

Diagnosis. Males of *C. compacta* with six spots on the pronotum will key to couplet 130 in Endrödi (1985), which is *C. quatuordecempunctata* Mannerheim. *Cyclocephala quatuordecempunctata*, however, has elytral setae, no pygidial spots, and parameres different from those of *C. compacta*. Specimens with only two or four spots on the pronotum do not go through the key. This kind of variation illustrates the difficulty in constructing a key that relies on the numbers of spots on the pronotum or elytra; specimens will not properly key if only one character state is mentioned. On the other hand, Mannerheim probably did not have a series that showed this variation nor possibly did Endrödi when he created the key. The parameres of *C. compacta* are somewhat similar to those of *C. howdenannae* Endrödi, but that species has an emarginate clypeus, no basal bead on the pronotum, and is larger (18 mm).

Cyclocephala hielkemaorum Ratcliffe, new species

(Figs. 21–24)

Type Material. Holotype male, labeled "FR. Guyana, Roura: Cacao, 3-7-2005, A. J. Hielkema//On mercury-light//Cyclocephala spec. G. det. M. A. Hielkema."



Figs. 21–25. *Cyclocephala hielkemaorum*: **21**) dorsal view of holotype; **22–23**) parameres (caudal and lateral views); **24–25**) right protarsus, median view, of **24**) *C. hielkemaorum* and **25**) *C. longitarsis*.

Allotype female, labeled “FR GUYANA, Roura: 300 m W of Chateau Cacao, 25/27-6-2005, A. J. Hielkema//flying at light.” Single male paratype labeled “FR GUYANA, Roura: Cacao, 23-7-2005, A. J. Hielkema//on mercury-light in forest//*Cyclocephala* species L, det. M. A. Hielkema.”

Holotype and allotype deposited at the University of Nebraska State Museum, Lincoln, NE. Paratype deposited in the Meindert Hielkema collection (Gouda, Netherlands).

Holotype. Male. Length 14.0 mm; width across humeri 6.7 mm. Color testaceous except for 3 small black spots on each elytron (post-humeral, post-scutellar, center of disc behind middle), and apices of femora, tibiae, protibial teeth, and tarsomeres black. *Head:* Surface finely shagreened, completely, densely punctate; punctures small, those on frons slightly larger than those on clypeus. Frontoclypeal suture biarcuate, weak. Clypeus with apex narrowly parabolic, with thin bead on margin. Interocular width equals 3.0 transverse eye diameters. Antenna 10-segmented, club subequal in length to segments 2–7. *Pronotum:* Surface minutely shagreened, completely, densely punctate, punctures similar in size to those of frons. Base with complete marginal bead. Posterior angles broadly rounded. *Elytra:* Surface finely shagreened, punctate; punctures moderately large, dense; double rows of punctate striae distinct, punctures in those rows setigerous, setae short and tawny. *Pygidium:* Surface vaguely shagreened, punctate; punctures moderately large, moderately dense, setigerous; setae moderately dense, long, tawny. In lateral view, surface evenly convex. *Legs:* Protibia bidentate, with slight swelling where basal, 3rd tooth would be. Protarsus strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 4th with large, ventral lobe (Fig. 24), 5th subequal in length to tarsomeres 2–4, nearly flat on ventral surface; median claw enlarged, strongly bent, apex entire. Metatarsus twice as long as metatibia. *Venter:* Prosternal process slender, conical. *Parameres:* Figs. 22–23.

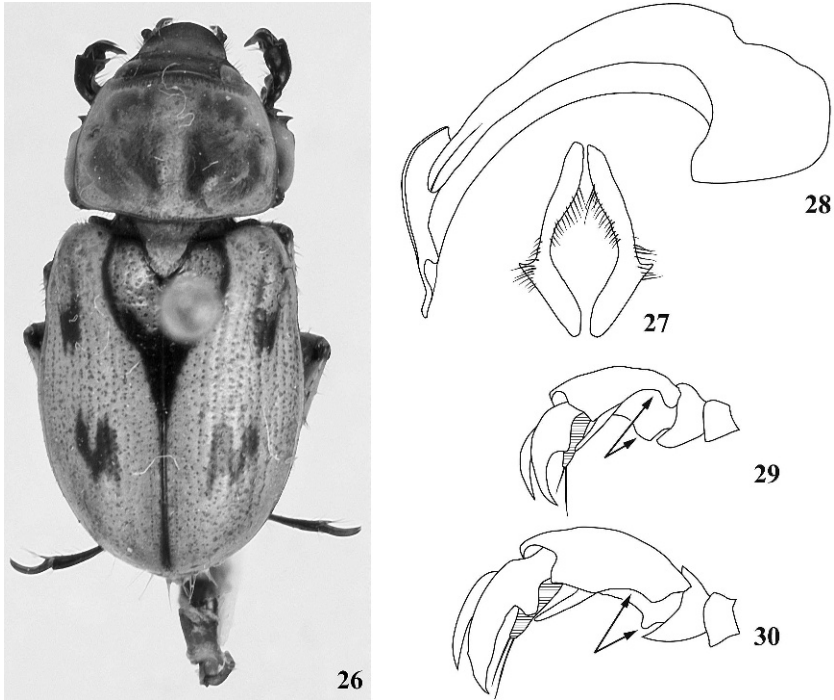
Allotype. Female. Length 12.6 mm; width across humeri 6.1 mm. As holotype except in the following respects: Color and pattern similar except elytra with postmedian, small, black spot absent, and swelling of elytral margin darkened. *Elytra:* Surface with setae minute or abraded away. Epipleuron (in ventral view) gradually tapering towards apex. Lateral margin slightly swollen at level of sternites 1–2. *Pygidium:* Surface glabrous, densely punctate, punctures small. In lateral view, surface nearly flat. *Legs:* Protibia tridentate, teeth subequally spaced. Protarsus simple, not enlarged. Metatarsus slightly longer than metatibia.

Variation. Males (1 paratype). Length 13.9 mm; width across humeri 6.6 mm. The paratype does not differ significantly from the holotype.

Etymology. This species is named in honor of Meindert Hielkema and his son, Auke, who were responsible for collecting this species in French Guiana and for generously sending me the specimens for study.

Distribution. *Cyclocephala hielkemaorum* is known only from the lowland rainforest near Cacao in French Guiana.

Diagnosis. *Cyclocephala hielkemaorum* will key to couplets 240/241 in Endrödi (1985), which end with *C. quadripunctata* Höhne and *C. peruana* Endrödi, respectively. Both of these species have a black frons, different parameres, and are smaller in size. *Cyclocephala hielkemaorum* is most similar, including the parameres, to *C. longitarsis* Dechambre from Ecuador. However, the protarsus of the males is significantly different: in *C. hielkemaorum*, the 4th tarsomere has a large, ventral lobe, and the 5th tarsomere is nearly flat on its venter (Fig. 24), whereas in *C. longitarsis* the 4th tarsomere is not expanded into a large lobe, and the 5th tarsomere is concave on its venter with the ventrolateral edge strongly toothed (Fig. 25). In addition, these two species are broadly separated geographically. *Cyclocephala hielkemaorum* is known from northeastern South America on the east side of the Andes, and *C. longitarsis* is known from western South America on the west side of the Andes.



Figs. 26–30. *Cyclocephala melanopoda*: **26)** dorsal view of paratype; **27–28)** parameres (caudal and lateral views); **29–30)** right protarsus, median view, of male of **29)** *C. melanopoda* and **30)** *C. herteli*.

***Cyclocephala melanopoda* Ratcliffe, new species**

(Figs. 26–29)

Type Material. Holotype male, labeled “ECUADOR: Pichincha Prov., Sto. Domingo, Tinalandia Resort, 0°13’S, 79°09’W, V-18-24-1997, 760 m, C. & K. Messenger.” Allotype female labeled “ECUADOR: Pichincha Pr., Tinalandia, 21 April 1999, F. T. Hovore/I. P. Smith//D. C. Carlson Collection, Gift from F. T. Hovore.” One paratype male with same data as allotype. One paratype male labeled “ECUADOR, 700’, Rio Palenque, 47 km S St. Domingo, Feb. 22–27 1976, H. & A. Howden.”

Holotype and allotype (property of D. Carlson) deposited at the University of Nebraska State Museum, Lincoln, NE. One paratype in the David Carlson Collection (Fair Oaks, CA) and one paratype in the Canadian Museum of Nature Collection, Ottawa, Canada.

Holotype. Male. Length 9.8 mm; width across humeri 4.2 mm. Color of clypeus, pronotum, elytra, pygidium, femora, and tibiae testaceous; frons, elytral pattern, sides of pygidium, apices of tibiae and femora, meso- and metatarsi, procoxae, venter of meso- and metathorax, and abdominal sternites black; protarsi piceous; protarsal claws black, meso- and metatarsal claws testaceous. Elytra with black, curved line extending from base either side of scutellum to

suture at about middle; 3 black, short streaks on disc. *Head*: Surface finely shagreened, opaque. Frons between eyes moderately densely punctate, punctures small. Remainder of head vaguely punctate or roughened. Clypeus with apex parabolic, rimmed in black, weakly reflexed. Interocular width equals 3.0 transverse eye diameters. Antenna 10-segmented, club subequal in length to segments 2–7. *Pronotum*: Surface weakly shining, finely shagreened, punctate; punctures dense (separated by; 1–2 puncture diameters), moderate in size, becoming indistinct near lateral margins. Posterior angles narrowly rounded. Base with complete marginal bead. *Elytra*: Surface weakly shining (a little more so than pronotum), punctate; punctures moderate in density and size (becoming slightly larger on sides), many weakly ocellate, paired punctate striae distinct. Posterior third with sparse, minute, stout setae. *Pygidium*: Surface weakly shining, finely shagreened, weakly punctate; punctures moderately dense, minute, some setigerous; setae sparse, pale, small. In lateral view, surface weakly convex in basal 3/4, more strongly convex in apical fourth. *Legs*: Protibia bidentate. Protarsus strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 5th long, curved, concave ventrally, ventromedial edge deeply emarginate, ventrolateral edge strongly produced onto a lobe (Fig. 29); median claw enlarged, strongly curved, apex obliquely truncate, entire. Metatarsus nearly twice as long as metatibia. *Venter*: Prosternal process short, stout; apex transversely oval with raised, transverse “button” on anterior half. Last sternite very deeply emarginate. *Parameres*: Figs. 27–28.

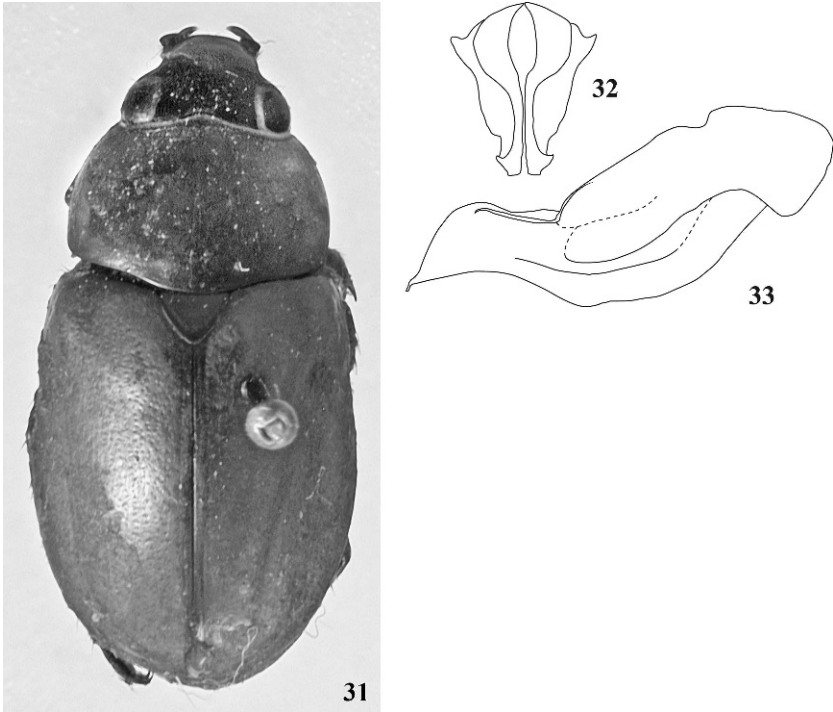
Allotype. Female. Length 9.3 mm; width across humeri 4.9 mm. As holotype except in the following respects: Color of clypeus dark brownish yellow; elytra with curved, black line interrupted at base either side of scutellum; subapical swelling on lateral margin black. *Head*: Clypeus weakly shining (not opaque), surface densely, finely rugopunctate. *Elytra*: In ventral view, epipleuron abruptly narrowed at level of sternite 2; lateral margin just above this slightly swollen. Minute setae sparser. *Pygidium*: Setae sparse, minute. In lateral view, surface nearly flat. *Legs*: Protibia tridentate. Protarsus not enlarged.

Variation. Males (2 paratypes). Length 9.8–10.0 mm; width across humeri 4.6–4.7 mm. As holotype except in the following respects: In one specimen, color of clypeus and sides of pygidium dark brownish yellow; pronotum with trace of light brown, longitudinal macula either side of midline on basal half; elytra with posterior 2 discal spots connected.

Etymology. The name is derived from the Greek words *melos*, for black, and *pous*, for foot, in reference to the black tarsomeres.

Distribution. *Cyclocephala melanopoda* is known from the southeast and southwest of Santo Domingo de los Colorados on the west side of the Andes (Tinalandia Resort on Hwy 30; Pichincha Province and Rio Palenque Research Center off of Hwy 25; Los Rios Province, respectively). The specimens were taken at lights.

Diagnosis. The parameres are similar to those of *C. herteli* Endrödi and *C. santaritae* Ratcliffe (both from Panama). *Cyclocephala melanopoda* resembles *C. herteli* in most external characteristics, except that in *C. melanopoda* the frons and most of the venter is black (testaceous or light brown in *C. herteli*), the male pygidium is setose (glabrous in *C. herteli*), and the tarsomeres are black (testaceous in *C. herteli*). In females, *C. melanopoda* has the elytral margin slightly swollen just above the abrupt constriction of the epipleuron, but in *C. herteli* the elytral margin is slightly swollen but also bi-emarginate. The most distinctive difference is the form of the male 5th protarsomere. In *C. melanopoda*, it is concave ventrally with the ventromedial edge deeply emarginate, and the



Figs. 31–33. *Cyclocephala monacha*: 31) dorsal view of holotype; 32–33) parameres (caudal and lateral views).

ventrolateral edge strongly produced onto a lobe (Fig. 29). In *C. herteli*, conversely, the ventral edges either side of the concavity each have a small “tooth” near the base, and the teeth are subequal in size to one another (Fig. 30).

Although the parameres of *C. melanopoda* and *C. santaritae* are similar, the similarities end there. *Cyclocephala melanopoda* is extensively black on the frons, elytral pattern, either side of the pygidium, legs, and venter, but *C. santaritae* has only a faint and different pattern on the elytra. In addition, the pygidium in *C. melanopoda* has sparse, small setae, whereas the pygidium in *C. santaritae* has dense, long setae. In the females, the swelling on the lateral margin of the elytra is small in *C. melanopoda*, but in *C. santaritae* it is developed into a distinct lobe.

Cyclocephala melanopoda superficially resembles *C. quadripunctata* Höhne and *C. peruana* Endrödi, but in these two latter species there are short setae on the clypeus and/or pronotum, and the parameres are of different form and more robust than those of *C. melanopoda*. This species will key as far as couplet 190 (*C. herteli*) in the key to male *Cyclocephala* species in Endrödi (1985).

***Cyclocephala monacha* Ratcliffe, new species**
(Figs. 31–33)

Type Material. Holotype male, labeled “Rio Cotuhe, Colombia, I19-1946.” Holotype deposited at the University of Nebraska State Museum, Lincoln, NE.

Holotype. Male. Length 17.0 mm; width across humeri 8.5 mm. Color of clypeus, pronotum, pygidium, legs, and venter dark reddish brown; frons black; elytra light reddish brown. *Head:* Entire surface similarly punctate, punctures small, moderate in density. Clypeus semicircular, apex weakly emarginate. Interocular width equals 2.5 transverse eye diameters. Antenna 10-segmented, club slightly longer than segments 2–7. *Pronotum:* Surface punctate, punctures small, moderate in density, becoming slightly larger and denser on sides. Posterior angles broadly rounded. Basal bead absent. *Elytra:* Surface minutely shagreened, punctures moderate in density and size, some in indistinct rows, sutural row distinct. *Pygidium:* Surface moderately densely punctate, punctures moderate in size, becoming smaller and sparser at apex. In lateral view, surface weakly convex in basal 2/3, strongly convex in apical third. *Legs:* Protibia tridentate, basal tooth small, removed from middle tooth. Protarsus strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 5th longer than tarsomeres 1–4 combined; median claw enlarged, strongly curved, apex split into large and small rami. Metatarsus subequal in length to metatibia. *Venter:* Prosternal process long, columnar; apex transversely oval with raised, transverse “button” on anterior half. Last sternite very deeply emarginate. *Parameres:* Figs. 32–33.

Etymology. The name is derived from the Greek word *monachos*, meaning single or solitary, in reference to the single type specimen and to the uniquely singular form of the parameres.

Distribution. *Cyclocephala monacha* is known only from the type locality at Rio Cotuhé, Amazonas, Colombia (2°53'S, 69°44'W). This is a small stream north of Leticia that feeds into the Rio Putamayo just south of Santa Clara near the Brazilian border. The habitat is lowland tropical rain forest. I have also seen this stream spelled Rio Catuhé on some maps.

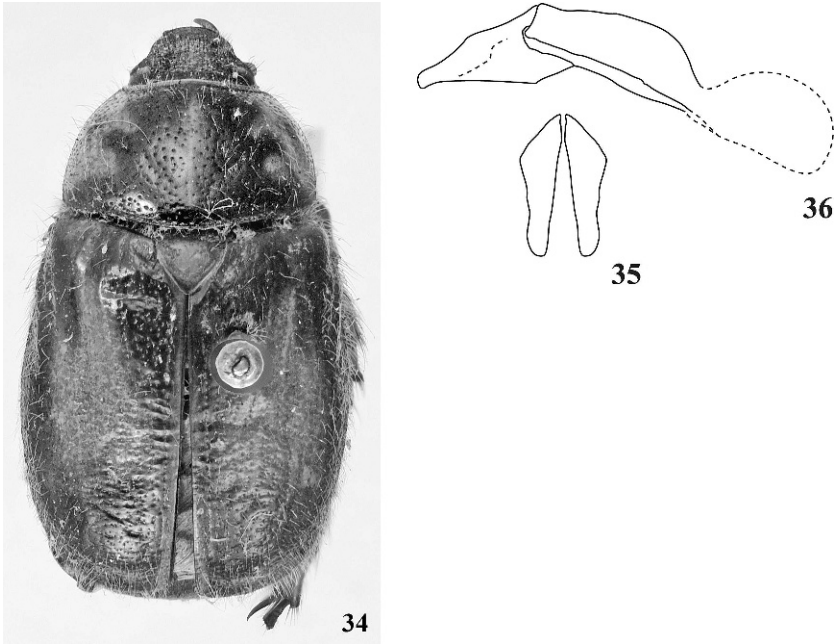
Diagnosis. The parameres (Figs. 32–33) are unique among *Cyclocephala* species. This species will key as far as couplet 415 in the key to male *Cyclocephala* species in Endrödi (1985), which is close to *C. contracta* Kirsch. While *C. monacha* is externally similar to *C. contracta*, the parameres are very different between the two species.

Cyclocephala perplexa Ratcliffe, new species

(Figs. 34–36)

Type Material. Holotype male, labeled “San Jose, Dept. La Paz, Bolivia, September 1925, GLHarrington.” Holotype deposited at the University of Nebraska State Museum, Lincoln, NE.

Holotype. Male. Length 12.5 mm; width across humeri 7.2 mm. Color dark testaceous, shining, except for black, longitudinal, externally undulating band on pronotum either side of middle and broad, piceous margins (all) of each elytron. *Head:* Surface completely, densely rugopunctate, setigerous; setae moderately dense, moderately long, tawny. Frontoclypeal suture arcuate. Clypeus with apex broadly rounded on angles, subtruncate, with distinct marginal bead. Eyes small, interocular width equals 3.8 transverse eye diameters. Antenna with 10 segments, club 3-segmented, long, subequal in length to segments 1–7. *Pronotum:* Surface finely shagreened, moderately densely punctate; punctures moderate in size, setigerous; setae moderate in density and length, tawny. Base with complete marginal bead. Posterior angles broadly rounded. *Elytra:* Surface coarsely, irregularly roughened, rows of punctures indistinct, setigerous; setae moderate in density and length, tawny. *Pygidium:* Surface opaque, finely shagreened, with small punctures moderate in density, setigerous; setae moderately dense, long, tawny. In lateral view, surface



Figs. 34–36. *Cyclocephala perplexa*: **34**) dorsal view of holotype; **35–36**) parameres (caudal and lateral views).

nearly flat. *Legs*: Protibia tridentate, basal tooth slightly removed from others. Protarsi missing. Metatarsi missing. *Venter*: Prosternal process long, columnar, apex expanded, transversely oval, with transverse, raised “button” on anterior half. Thoracic sternites with long, dense, tawny setae. *Parameres*: Figs. 35–36.

Etymology. The combination of character states for this species is unique (especially the short, robust body form) and the absence of all the tarsomeres presents some degree of uncertainty. Hence, this species is perplexing.

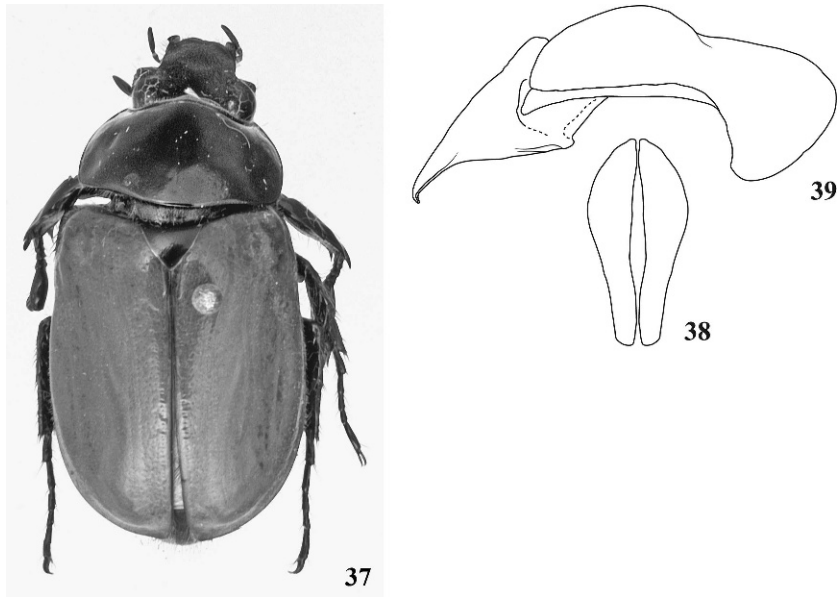
Distribution. *Cyclocephala perplexa* is known only from, presumably, San José near the Rio Beni to the northeast of La Paz at an elevation of 500–1,000 meters. The habitat has, no doubt, been drastically changed since the specimen was collected more than 80 years ago.

Diagnosis. The combination of relatively short and broad body form, coarse elytral sculpturing, color pattern, long antennal club, small eyes, dense setae both dorsally and ventrally, and the simple parameres is unique for this species. This specimen of *C. perplexa* will not key past couplet 53 in Endrödi (1985) because it lacks protarsi. However, it is possible to go past this point because the parameres are different than those of species that occur in this section of the key. At couplet 100, the absence of protarsal claws makes it impossible to proceed any further in the key.

***Cyclocephala saltini* Ratcliffe, new species**

(Figs. 37–39)

Type Material. Holotype male, labeled “PERU: Huanuco, Chinchao, 1,800 m. III-2006.” Allotype female, labeled “PERU, Carpish, 20 km E. Acomayo, Dept.



Figs. 37–39. *Cyclocephala saltini*: 37) dorsal view of holotype; 38–39) parameres (caudal and lateral views).

Huanuco, Oct 1946.” One male paratype with same data as holotype. Two male paratypes labeled “PERU, Carpish, 20 km E. Acomayo, Dept. Huanuco, Oct 1946.”

Holotype, allotype, and one paratype deposited at the University of Nebraska State Museum, Lincoln, NE. One paratype deposited in the U. S. National Museum, Washington, D. C., and one paratype placed in the Brett C. Ratcliffe Collection (Lincoln, NE).

Holotype. Male. Length 18.7 mm; width across humeri 9.4 mm. Color black except for dark testaceous elytra, shining. *Head:* Frons with punctures moderate in density and size. Frontoclypeal suture biarcuate, distinctly impressed. Clypeus densely rugopunctate, punctures slightly larger than those on frons; apex broad, weakly emarginate at middle, slightly reflexed, with slender marginal bead. Interocular width equals 2.5 transverse eye diameters. Antenna 10-segmented, club subequal in length to segments 2–7. *Pronotum:* Surface weakly shagreened, sparsely punctate; punctures small on disc, becoming moderate in size on sides. Base lacking marginal bead. Posterior angles broadly rounded. *Elytra:* Surface finely shagreened, punctate; punctures moderate to moderately large, dense; double rows of punctate striae visible. *Pygidium:* Surface finely shagreened, punctures moderate in size and density, setigerous; setae moderately dense, long, tawny. In lateral view, surface convex, more so on apical half. *Legs:* Protibia tridentate, basal tooth small, strongly removed from apical 2 teeth. Protarsus strongly enlarged; tarsomeres 2–4 each slightly larger than preceding; 5th curved, subequal in length to tarsomeres 1–4, nearly flat on ventral surface; median claw enlarged, strongly bent, apex narrowly split into large and small rami (small ramus broken off on each claw). Metatarsus subequal in length to metatibia. *Venter:* Mentum, meso- and metasternites with dense, long, tawny setae.

Prosternal process long, columnar, apex expanded, transversely oval, with transverse, raised "button" on anterior half. *Parameres*: Figs. 38–39.

Allotype. Female. Length 19.4 mm; width across humeri 10.8 mm. As holotype except in the following respects: Color testaceous except for black frons and reddish brown tarsi. *Elytra*: In ventral view, epipleuron gradually tapered at level of sternite 1; lateral margin just above this swollen into elongate flange. *Pygidium*: Setae sparse, short. In lateral view, surface nearly flat. *Legs*: Protarsus not enlarged.

Variation. Males (3 paratypes). Length 19.2–19.6 mm; width across humeri 9.7–10.0 mm. Two paratypes with black head, pronotum, and scutellum as in holotype, one paratype testaceous with black frons as in allotype. Otherwise, the paratypes do not differ significantly from the holotype. The interocular width equals 2.1 transverse eye diameters in two paratypes and 2.5 in another. One Carpish specimen has the apices of the parameres missing.

Etymology. This species is named in honor of Jochen-P. Saltin (Niedernhausen/Taunus, Germany), who generously donated the Chinchao specimens for study.

Distribution. *Cyclocephala saltini* is known only from Chinchao and Carpish, both just to the northeast of the city of Huánuco in Huánuco province on the east side of the Andes in northern Peru.

Diagnosis. *Cyclocephala saltini* is distinctive because of the combination of its relatively broad shape and depressed body form, setose venter, coloration, and form of the male parameres.

Acknowledgments

I am grateful to Max Barclay (Dept. of Entomology, The Natural History Museum, London, UK) and Darren Mann (Hope Entomological Collections, Oxford University Museum of Natural History, Oxford, UK) for loaning me the specimens of *Cyclocephala acoma*. I thank David Carlson (Fair Oaks, CA) for loaning me numerous specimens of *Cyclocephala* species for study and description and permitting primary types to remain at the University of Nebraska State Museum. Jochen-P. Saltin (Niedernhausen/Taunus, Germany) graciously donated specimens of *C. saltini* for study. I am grateful to Sébastien Rojkoﬀ (Lyon, France) for donating specimens he collected in French Guiana that turned out to be paratypes of *C. carlsoni*. I thank Meindert Hielkema (Gouda, Netherlands) for sending me the specimens named after him and his son. Charles Messenger (formerly Entomology Collections Manager at the University of Nebraska State Museum) and Alex Reifschneider (Lincoln, NE) both collected specimens of *C. compacta*. Matthew R. Moore (undergraduate research assistant, University of Nebraska State Museum) and Federico Ocampo (Entomology Collections Manager, University of Nebraska State Museum) are acknowledged for taking the Automontage images of the new species. Angie Fox (Scientific Illustrator, University of Nebraska State Museum) digitized and made ready the image files. This project was supported, in part, by an NSF/PEET grant (DEB 0118669) to M. L. Jameson and B. C. Ratcliffe and an NSF Multiuser Equipment grant (DBI 0500767) to M. L. Jameson and F. Ocampo.

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BOOK REVIEW

LAROCHELLE, A. AND M.-C. LARIVIÈRE. 2007. **Carabidae (Insecta: Coleoptera): synopsis of supraspecific taxa.** Fauna of New Zealand 60, 188 pp. Manaaki Whenua Press, New Zealand (<http://www.mwpress.co.nz>). ISBN 978-0-478-09394-0. Price: Price \$42.55 USD.

A companion to and extension of Fauna of New Zealand, No. 43, “Carabidae...: Catalogue” (Larochelle and Larivière 2001), this volume also was written by the passionately enthusiastic, industrious Larochelle-Larivière pair of authors (additionally, they wrote No. 53, the tribe Harpalini [Larochelle and Larivière 2003]). It is a first-time taxonomic review of all New Zealand supraspecific taxa, and is an admirable response to the North American reviewers of the “Catalogue” (Ball 2002; Bell 2002), who called for a volume like the one that is the subject of this review. Quoting the authors (p. 15), included in the volume are “comparative descriptions for subfamilies, tribes, subtribes, genera and subgenera; identification keys for subfamilies, tribes and genera; habitus drawings, distributional and ecological information; and summaries of collecting techniques for all genera; the most relevant bibliographic references for all taxa; an updated checklist of species, and a summary of all taxonomic changes since the publication of the Catalogue by Larochelle and Larivière (2001).”

The volume begins with a prefatory section in both English and Maori, entitled “Popular Summary,” followed by biographical notes about the authors, and an eloquent “Dedication” to the late Everard B. Britton (1919–2004), in recognition of his excellent taxonomic treatments of various segments of the New Zealand carabid fauna, published between 1940 and 1964.

The “Morphology and Terminology” section seems unduly brief (only about a half column in length), but it includes reference to a glossary of four pages, and to 142 carefully labeled diagrams occupying 14 plates, that illustrate in a most satisfactory manner all of the character states that one needs to successfully use the keys provided.

The text is organized taxonomically, employing a hierarchical system. Each taxon is characterized in substantial detail, using principally external morphological features. References on a world-wide basis are provided for descriptions, keys, and taxonomic treatments by previous authors. For each genus, the following additional information is provided: figure and map numbers, number of taxa in the New Zealand subregion, geographical distribution and ecology, collecting techniques, and taxonomic notes.

Linkage between verbal abstractions (descriptions) and the beetles themselves is provided by simple, clear habitus illustrations (without legs or antennae) of one or more representatives of each genus. Additionally, a small figure of the bulky broscine, *Brullea antarctica* Laporte de Castelnau appears on the cover of this volume. A beautiful photographic frontispiece, in color, illustrates the pterostichine *Megadromus antarcticus* Chaudoir, and a small figure in color of another broscine, *Mecodema regulus*, precedes the "popular summary."

A series of outline maps of the principal islands of the New Zealand subregion, one for each of the 86 genera and arranged in alphabetical order by generic name, illustrate in a generalized fashion the geographical range of these taxa. An outline map illustrates form and position of the islands of the New Zealand subregion, and two maps illustrate the names and positions of the localities in which carabids have been collected.

This work is an excellent taxonomic account of a remarkably diverse and divergent component of the New Zealand subregion, and provides a firm basis for those who wish to undertake taxonomic or ecological work on the New Zealand Carabidae. Much remains to be done, as indicated by the final note for most generic treatments: "This genus is in need of further revision." But the inclusion of numerous taxonomic references and the illustrations of structural key features make this volume useful worldwide. It should be on the book shelf of anyone, anywhere, who is interested in carabid beetles. This book embodies the kind of synopsis needed for each of the major biogeographical regions, if knowledge of Carabidae is to be advanced rapidly, world-wide. This reviewer extends heartfelt congratulations and thanks to the authors.

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