emarginate posteriorly (as in worker, Fig. 3b). Hind femur with strong ventral carinae and lobe (as in worker, Fig. 4b, FL).

MALES (diagnosis): Measurements as in Table 2. Antennae with 13 antennal segments, palpal formula 4, 2. Mandibles with four or five teeth, the basal (fifth) tooth sometimes reduced to a rounded basal angle. As in the workers and gynes, head and alitrunk rather uniformly foveate, the foveae occasionally surrounded by circlets of whitish "bloom"; pilosity as in the other castes.

Males of *C. muelleri* are generally difficult to distinguish from males of *C. longiscapus,* but they differ in the following characters: As in workers and gynes, the postpetiole of *C. muelleri* males in dorsal view is strongly emarginate posteriorly (Fig. 7b); in *C. longiscapus* males, the postpetiole is very weakly emarginate (Fig. 7a). Propodeal spines longer than those of *C. longiscapus* males (Fig. 6a, PS), the total spine length exceeding the spine width at the base (Fig. 6b, PS). All males of *C. muelleri* examined are uniformly yellow/orange in color, with darker pigmentation restricted to the integument immediately surrounding the ommatidia, as might be expected from a nocturnal or crepuscular flier. Based on three dissections (a male from each of three nests), there is no difference between *C. muelleri* and *C. longiscapus* in male genitalic morphology (as described above for *C. longiscapus).*

NEST ARCHITECTURE (diagnosis): Nest entrance architecture constitutes a generally useful field character for distinguishing between nests of *C. muelleri* and *C. longiscapus.* All nest architecture observations for *C. muelleri* originate from Panama and, as far as is known, *C. muelleri* constructs nest entrances of the auricle type only (Fig. 8c), and not of the swallow's-nest type (Fig. 8a). Auricle dimensions are summarized in Table 3. In *C. muelleri,* nest entrance auricles are "mouth-like," usually wider than high (i.e., longer in the horizontal than in the vertical dimension), and, rather than flared, the auricle rim is merely swollen or thickened beyond the circumference of the base (Fig. 8c).

In his discussion of *C. longiscapus,* Kempf (1966, p. 167) mentions two specimens collected by W.L. Brown, Jr., and E.S. McCluskey in January 1960 on Barro Colorado Island, Panama (collection no. B-55), which "although basically resembling, I hesitate in definitely ascribing to the present species" [i.e., to *C. longiscapus*]. Although these specimens (a worker and a gyne) could not be located and thus could not be examined for the present study, they are assignable to *C. muelleri* based on: (1) the fact that so far only *C. muelleri* – and not *C. longiscapus* – has been collected on Barro Colorado Island (UGM, pers. obs.); and, more importantly, (2) Kempf's succinct description of the worker: "Mesonotum having only the anterior pair of tubercles developed, the rest being flat … Mesoepinotal impression obsolete … Hind femora ventrally lobate and carinate on basal third … [Postpetiole] with a deeper middorsal impression, stronger posterior paired tubercles, which project beyond the mesially deeply excised posterior border" (Kempf, 1966: p. 167). Kempf's reported worker head measurements (HL=0.72 mm, HW=0.56 mm) fall slightly outside the observed lower range for *C. muelleri,* but reported worker Weber's length (1.01 mm) and all gyne measurements (HL=0.88 mm; HW=0.69 mm; WL=1.22 mm) fall within the observed ranges (Table 2).

Distribution: *C. muelleri* is currently known almost entirely from the wetter forests of central Panama, but a single specimen collected in wet forest in Ecuador (see below) indicates that this species (or a cryptic, closely related species) also occurs in South America.

Paratypes: Panama: 868 workers (67 nests), 253 gynes (52 nests), and 385 males (40 nests); see Appendix. Ecuador: 1 worker.

Collection data: Panamanian specimens: see Appendix. Ecuadorian specimen: 1 worker (MZSP): Ecuador: Esmeraldas; 10 km. south of Atacames; isca no solo ("bait on ground"); 7-xi-1987; C.R.F. Brandão and C.D. Bastidas, collectors. This specimen was taken in wet forest at sardine bait (C.R.F. Brandão, pers. comm.).

Specimen deposition: USNM (holotype, paratypes), MCZ (paratypes), LACM (paratypes), MZSP (paratypes), BM (paratypes), CASC (paratypes).

Etymology: It gives us great pleasure to name this species in honor of our friend and colleague Ulrich G. Mueller, who, through diligent field work and exemplary biological study, has pioneered this ideal group of model organisms for attine research.

Results

Morphometrics

WORKERS: Based on measurements taken from 52 *C. longiscapus* workers from 26 nests and from 56 *C. muelleri* workers from 28 nests from Panama (Table 2), *C. muelleri* workers are on average significantly larger than *C. longiscapus* workers in both head and body length, but only marginally larger in head width (two-tailed t test on average values: HL: $t=3.959$, $df=105$, $P<0.001$; HW: $t=1.975$, $df=104$, $P=0.0510$; WL: $t=4.435$, $df=105$, $P<0.0001$). A comparison of 20 workers from a single nest of *C. longiscapus* (Panama) with 20 workers from a single nest of *C. muelleri* (Table 2) follows the same pattern (two-tailed t test on average values: HL: $t=6.804$, $df=37$, $P<0.0001$; HW: $t=0.458$, $df=35$, $P=0.650$; WL: $t=7.542$, $df=36$, $P<0.0001$). Though demonstrably real and biologically interesting, size difference is of little practical value for separating the two species, at least in Panama.

Based on measurements taken from 21 Colombian *C. longiscapus* workers from three nests and from 52 Panamanian *C. longiscapus* workers from 26 nests (Table 2), Colombian *C. longiscapus* workers are significantly larger than Panamanian *C. longiscapus* workers (two-tailed t test on average values: HL: $t=15.815$, $df=46$, $P<0.0001$; HW: $t=9.178$, $df=27$, $P<0.0001$; WL: $t=14.798$, $df=32$, $P<0.0001$). Based on measurements from 56 *C. muelleri* workers taken from 28 nests (Table 2), Colombian *C. longiscapus* workers are also larger than *C. muelleri* workers (two-tailed t test on average values: $t=12.848$, $df=43$, $P<0.0001$; HW: $t=8.214$, $df=26$, $P<0.0001$; WL: $t=11.685$, $df=33$, $P<0.0001$). There is minimal overlap in the ranges of these three parameters between the known Colombian and Panamanian *C. longiscapus* populations, and a greater overlap between the ranges of the Colombian *C. longiscapus* and *C. muelleri.* Curiously, the single known Costa Rican specimen of *C. longiscapus,* a worker, is much closer in size to the Colombian *C. longiscapus* than it is to the Panamanian *C. longiscapus* specimens (Table 2). Measurements from the single known non-Panamanian *C. muelleri* worker specimen, from Ecuador, fall within the ranges of the Panamanian specimens of this species (Table 2).

Visual inspection suggests that, of the three Colombian *C. longiscapus* specimen series, the Silverstone series (5 workers taken from the stomach of a poison-dart frog) are consistently larger than the other 16 Colombian worker specimens. Statistical comparisons indicate that, indeed, the Silverstone workers have longer heads and bodies than the other Colombian worker specimens (two-tailed t test on average values: HL: $t=6.951$, $df=17$, $P<0.0001$; HW: $t=1.203$, $df=18$, $P=0.245$; WL: $t=3.700$, $df=15$, $P<0.01$).