Herpetologica, 68(3), 2012, 375–392

REDISCOVERY OF *ATRACTUS MICRORHYNCHUS* AND REAPPRAISAL OF THE TAXONOMIC STATUS OF *A. EMERSONI* AND *A. NATANS* (SERPENTES: DIPSADIDAE)

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Abstract: The species *Rhabdosoma microrhynchum* (now *Atractus microrhynchus*) was originally described based on a single specimen collected by the Orton Expedition at "Guayaquil," in the Guayas province on the Pacific coast of Ecuador. The holotype is currently lost and all specimens previously referred to this species were misidentified on the basis of material from Peruvian Amazonia. While examining museum collections and conducting fieldwork in the Pacific lowlands of Ecuador and Peru, we found specimens assignable to *A. microrhynchus*. In this study, we report the morphological variation in these new specimens of *A. microrhynchus* and evaluate the taxonomic status of the Amazonian species previously confused with it. We restrict the concept of *A. microrhynchus* to the Pacific lowland populations from Ecuador and Peru, and we designate a neotype for the species. Based on the examination of the types of *A. emersoni* and *A. natans* from Amazonia, we found that there is wide overlap in the internal and external characters of both taxa. Therefore, *A. emersoni* is relegated to the synonymy of *A. natans*. Furthermore, we compared *A. microrhynchus* with all congeners and discuss its affinities with the *A. multicinctus* species group based on shared, exclusive hemipenial features.

Resumen: La especie *Rhabdosoma microrhynchum* (ahora *Atractus microrhynchus*) se basó en un solo espécimen colectado por la Expedición Orton en "Guayaquil," provincia de Guayas, costa Pacífica del Ecuador. El holotipo está actualmente perdido y todos los especímenes previamente referidos a esta especie fueron identificados erróneamente sobre la base de material de la Amazonía Peruana. Durante la revisión de colecciones de museos y la realización de trabajo de campo en las tierras bajas del Pacífico de Ecuador y Perú, encontramos especímenes que se pueden asignar a *A. microrhynchus*. En este estudio, reportamos sobre la variación morfológica de estos nuevos especímenes de *A. microrhynchus* y evaluamos el estado taxonómico de las especies Amazónicas previamente confundidas con esta. Restringimos el concepto de *A. microrhynchus* para las poblaciones de las tierras bajas del Pacífico de Ecuador y Perú y designamos un neotipo para la especie. Basados en la revisión de los tipos de *A. emersoni* y *A. natans* de la Amazonía, encontramos que hay una amplia superposición de las características de ambos taxones. Por lo tanto, *A. emersoni* se coloca bajo la sinonímia de *A. natans*. Más aún, comparamos *A. microrhynchus* con todos sus congeners y sus afinidades con el grupo-de-especies *A. multicinctus* son discutidos sobre la base de las características hemipenianas exclusivas compartidas.

Key words: Amazonia; *Atractus multicinctus* species group; Hemipenial features; Morphological variation; Pacific lowlands; Species boundaries

The Dipsadine snake genus *Atractus* Wagler 1828, comprises small- to moderate-sized snakes that have secretive lifestyles and feed on earthworms, arthropods, and molluscs (Passos et al., 2010c). The genus is widely distributed in the Neotropics from Panama to Argentina (Giraudo and Scrocchi, 2000; Myers, 2003); it occurs primarily on the mainland from sea level to 4500-m elevation and occupies almost all South American biomes (Passos et al., 2010c). *Atractus* is a highly diverse genus that is closely related to *Adelphicos* Jan, 1862 and *Geophis* Wagler, 1830 (Savage, 1960; Downs, 1967; Fernandes, 1995; Zaher, 1999; Passos, 2008), comprising approximately 130 valid species, most of them known to date only from their proper type specimens (Passos and Fernandes, 2008; Prudente and Passos, 2008; Passos et al.,

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2009b,c,d,e). Although many currently recognized species remain poorly evaluated, much of our understanding of the taxonomy of *Atractus* has been considerably improved in the past 5 yr (Cisneros-Heredia, 2005; Passos et al., 2005; Zaher et al., 2005; Kok, 2006; Myers and Schargel, 2006; Prudente and Santos-Costa, 2006; Kok et al., 2007; Passos et al., 2007a,b; Passos and Fernandes, 2008; Prudente and Passos, 2008; Passos and Arredondo, 2009; Passos et al., 2009a,b,c,d,e, 2010a,c; Prudente and Passos, 2010). Even so, additional efforts must be made to address problems of morphological variation, geographic ranges, sexual dimorphism, polymorphism, and ontogenetic change of coloration for many taxa or species complexes that remain problematic (Passos et al., 2010a). In this sense, only by addressing all of these aspects and, at the same time, rigorously comparing newly obtained samples with the large number of available names in the literature can we clarify the species boundaries of this complex and poorly understood genus (Passos and Lynch, 2010).

Rhabdosoma microrhynchum (Cope, 1868) was described based on a single individual collected by the Orton Expedition at Guayaquil in the Pacific lowlands of Ecuador. Cope (1868), in the original description, suggested that this species was closely related to Atractus badius (Boie, 1827). Subsequently, Cope (1870) reported *R. microrhynchum* from Pebas in the Peruvian Amazonia on the basis of new material from the same expedition. Boulenger (1894) redefined the genus *Atractus* and proposed the synonymization of *R. microrhynchum* with *A. badius*. Savage (1960), although resurrecting *A. microrhynchus*, considered that the taxonomic status of this species could not be accurately assessed because the original description was brief and the holotype was apparently lost. Savage (1960) also suggested the possibility that the type locality could be wrongly labeled given that the Orton Expedition collected material on both sides of the Andes and that no additional specimens referable to *A. microrhynchus* had been collected in Guayaquil. Dixon and Soini (1977) proposed once again the synonymy of *A. microrhynchus* with *A. badius* based on specimens from the Iquitos region in Peru. Hoogmoed (1980) designated the lectotype of *A. badius* and did not consider *A. microrhynchus* as a proper synonym of the latter species, restricting the distribution of *A. badius* to the Guayana region. In light of the new definition of *A. badius*, Dixon and Soini (1986) reconsidered the taxonomic status of their Iquitos specimens as *Atractus* cf. *microrhynchus*. In spite of Hoogmoed's work, some authors still consider *A. badius* to be a widespread taxon distributed in Amazonian and Andean regions of Colombia and Peru (Pérez-Santos and Moreno, 1988; Carrillo and Icochea, 1995) or even the junior synonyms (*A. subbicinctus* [Jan, 1862] and *A. micheli* Mocquard, 1904) to be valid species (Claessen, 2002, 2003).

Hoogmoed and Prudente (2003) described *A. natans* on the basis of three individuals from extreme (west and east) portions of Brazilian Amazonia (Uarini approximately 1000 km east of Melgaço), but restricted their comparisons to species distributed in Central Amazonia and the Guiana Shield. Subsequently, Silva (2004) described *A. emersoni* based on two specimens from Benjamin Constant in Brazil, and another individual from Leticia in Colombia, near the border between Brazil and Peru. Despite the geographic proximity of the type locality of *A. emersoni* to Iquitos (approximately 360 km by air), the author did not compare their putative new taxon with *Atractus* cf. *microrhynchus* (sensu Dixon and Soini, 1986). Recently, Passos et al. (2009e) revised the taxonomic status of Pacific lowland species of *Atractus* and recognized 10 species distributed from Colombia to Ecuador. In that paper, the authors recognized *A. microrhynchus* as valid species and mentioned newly discovered material of the species apparently collected near the type locality in Ecuador. Although Passos et al. (2009e) pointed out that the specimens examined by Dixon and Soini (1977, 1986) actually refer to *A. natans* by mistake, they cited both studies on the synonymy list of *A. microrhynchus*. Therefore, the inclusion of such references in the list of synonymy of *A. microrhynchus* must be interpreted as an error rather than an ambiguity with respect to the status of the specimens of the Iquitos Region.

We redescribe *A. microrhynchus* based on new specimens discovered in collections and in the wild. We report on the meristic, morphometric, hemipenial, and color-pattern characters, and we propose a neotype for the species. In addition, we evaluate the taxonomic status of the Amazonian species that were previously confused with *A. microrhynchus*, and we discuss the affinities of *A. microrhynchus* on the basis of morphological characters.

Materials and Methods

We examined specimens in the following institutions: Brazil—Museu Paraense Emílio Goeldi (MPEG), Belém; Colombia—Instituto de Ciencias Naturales (ICN), Universidad Nacional de Colombia, Bogotá; Ecuador—División de Herpetología del Museo Ecuatoriano de Ciencias Naturales (DHMECN), Quito; Peru—Museo de Historia Natural de la Universidad Mayor de San Marcos (MUSM), Lima; and United States—American Museum of Natural History (AMNH), New York; National Museum of Natural History (USNM), Smithsonian Institution, Washington DC; Texas Cooperative Wildlife Collections (TCWC), Texas A&M University, College Station. Geographic coordinates (based on the datum WSG84) of localities were recorded in the field, obtained from museum databases, or taken from geographical gazetteers (Stephens and Traylor, 1983; Paynter and Traylor, 1991). Whenever possible, we refined the coordinates obtained from literature with aid of the software Google Earth 6.2.

Characters used are based on meristics, morphometrics, maxillary dentition, and hemipenis morphology. Terminology for *Atractus* cephalic shields follows Savage (1960), whereas the method of counting ventral scales follows Dowling (1951). Terminology used to describe the condition of the loreal scale follows Passos et al. (2007b). We took measurements with dial calipers to the nearest 0.1 mm under an optical stereoscope, except for snout–vent (SVL) and caudal lengths (CL); SVL and CL were measured with a flexible ruler to the nearest millimeter. The terminology for body and tail size follows Passos et al. (2009e). We took measurements for paired cephalic shields only on the right side of the head. Terminology for hemipenis descriptions follows Dowling and Savage (1960) and Zaher (1999). Techniques for hemipenis eversion of preserved specimens follow Pesantes (1994). Although all hemipenes have been completely everted, some of them are not fully inflated, as is common with preserved organs (Myers and Cadle, 2003). We examined maxillae in situ through a narrow lateromedial incision between supralabials and the maxillary arch. We removed tissues covering the maxillary arch, and we counted teeth as well as empty sockets. Terminology for teeth and maxillary conditions follow Passos et al. (2009e). Additional specimens of *Atractus* examined are listed in Passos et al. (2005; 2007a,b; 2009b,c,d,e; 2010a,b,c), Passos and Arredondo (2009), Passos and Fernandes (2008), Passos and Lynch (2010), Prudente and Passos (2008, 2010).

Results

Atractus microrhynchus *(Cope, 1868)* *(Figs. 1–3)*

Rhabdosoma microrhynchum Cope, 1868; Proc. Acad. Nat. Sci. Philadelphia 1868:102.

Atractus badius Boulenger, 1894; Catalogue of the Snakes in the British Museum vol. 2:308. (in part).

Atractus microrhynchus Savage, 1960; Misc. Publ. Mus. Zool. Univ. Michigan 112:2.

Atractus microrhynchus Passos et al., 2009e; Zootaxa 2293:19.

Holotype.—Unknown sex, California Academy of Sciences (CAS 6693), from Guayaquil (02°10′S, 79°54′W, ca. 50 m above sea level [asl]), Guayas Province, Ecuador, collected by the Orton Expedition in 1867–1868. Savage (1960) pointed out that the holotype was missing at the CAS, and it currently remains lost (N. Gilmore, personal observation).

Neotype.—Adult male, DHMECN 3008, collected March 2005 by Francisco Sornoza at Reserva Biológica Buenaventura (03°38′55″ S, 79°45′50″W, ca. 600 m asl), Parroquia Piñas, Cantón Piñas, El Oro Province, Ecuador (by current designation; see Remarks).

Referred Specimens.—Juvenile male, AMNH 108943, collected April 1972 by Rhea Warren at Río Palenque, 50 km N of Quevedo

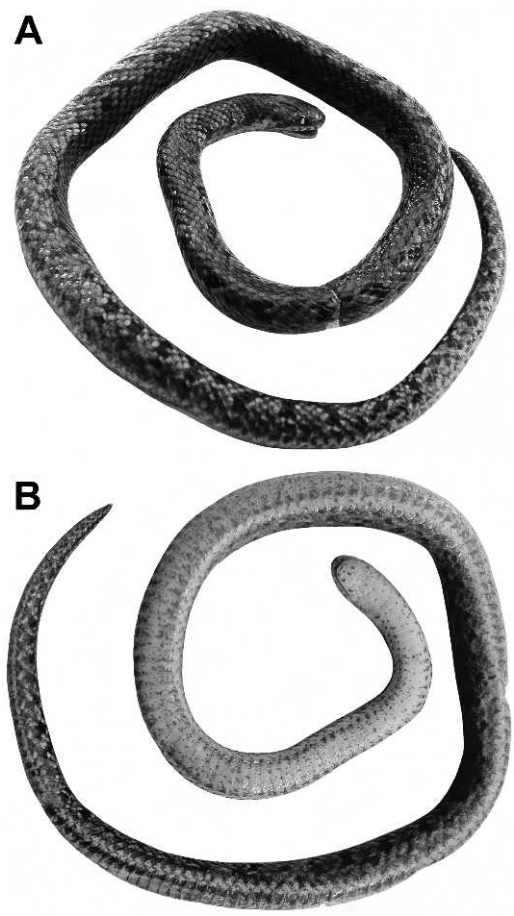

FIG. 1.—Dorsal (A) and ventral (B) views of the neotype of *Atractus microrhynchus* (DHMECN 3008), from Reserva Biológica Buenaventura, El Oro Province, Ecuador.

(01°02′S, 79°27′W, ca. 110 m asl), Los Ríos Province, Ecuador. Adult males, MUSM 22829–30, collected 5–10 May 2005 by Richard Cadenillas at Campo verde, Cerros de Amotape National Park (between 03°50′23″ S, 80°09′59″W, 799 m asl and 03°50′44″S, 80°11′11″W, 570 m asl), Tumbes region, Peru.

Diagnosis.—*Atractus microrhynchus* is distinguished from all congeners by the following combination of characters: (1) 17-17-17 smooth dorsal scale rows; (2) two postoculars; (3) long loreal; (4) temporals 1+2; (5) seven supralabials, third and fourth contacting orbit; (6) seven infralabials, first three contacting chinshields; (7) six to seven maxillary teeth; (8) three gular scale rows; (9) three preventrals; (10) 143–150 ventrals in males; (11) 32–35 subcaudals in males; (12) dorsum brown to light reddish brown, occasionally with paired irregular white-bordered black blotches; (13) ventral ground color cream, heavily marked with dark-brown dots, forming an irregularly blotched belly; (14) small body size in males (reaching 293 mm SVL); (15) long tail in males (18–18.1% of SVL); and (16) hemipenis strongly bilobed, barely semicapitate, and semicalyculate.

Comparisons.—Among all congeners, *A. microrhynchus* shares a strongly bilobed hemipenis with lobes of equivalent size or longer than hemipenial body, sulcus spermaticus bifurcating on the basal region of the organ, and intrasulcar region with enlarged, narrow hooked spines exclusively as with members of the *A. multicinctus* (Jan, in Jan and Sordelli, 1865) species group (sensu Passos et al., 2009e). *Atractus microrhynchus* differs from all of them by having a strongly pigmented venter, with dark brown dots irregularly distributed throughout (vs. venter creamish white with dark spots, when present, only on posterior region of body). On the basis of external characters, *A. microrhynchus* shares a reddish brown to reddish light brown dorsal ground color only with *A. dunni* Savage, 1955; *A. echidna* Passos, et al., 2009; *A. ecuadoriensis* Savage, 1955; *A. iridescens* Peracca, 1896; *A. lasallei* Amaral, 1931; *A. lehmanni* Boettger, 1898; *A. loveridgei* Amaral, 1930; and *A. occidentalis* Savage, 1955. *Atractus microrhynchus* differs from *A. dunni*, *A. iridescens*, and *A. occidentalis* in having 143–150 ventrals in males, a single postdiastemal tooth, and a strongly bilobed and slightly semicapitate hemipenis, with four enlarged hooked spines arranged in longitudinal series above the sulcus spermaticus bifurcation (vs. 131–143 ventrals in *A. occidentalis*; 128–144 in *A. dunni*, and 135–143 *A. iridescens*; two postdiastemal teeth in the three species; a moderately bilobed and noncalyculate hemipenis with lateral projection on the basal region of hemipenial body in *A. iridescens*, hemipenis having a thick intrasulcar region with ca. 15 enlarged hooked spines disposed on transversal [2/3/4/3/2]

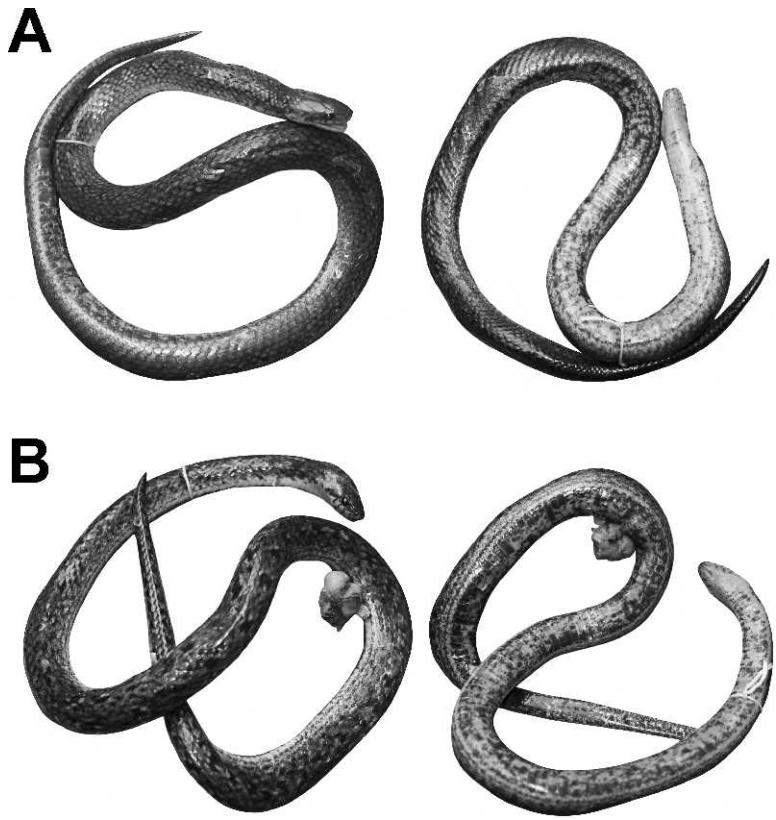

FIG. 2.—Dorsal (left) and ventral (right) views of the Peruvian specimens of *Atractus microrhynchus* (A) MUSM 22829 and (B) MSUM 22830.

series in *A. dunni* and *A. occidentalis*); from *A. echidna* in having 17 dorsal scale rows (vs. 15); from *A. ecuadoriensis* in having venter heavily marked with brown dots and six or seven maxillary teeth (vs. uniformly creamish white venter and eight maxillary teeth); from *A. lasallei*, *A. lehmanni*, and *A. loveridgei* in having 32–35 subcaudals in males, five or six prediastemal teeth with a single postdiastemal tooth, and hemipenis strongly bilobed (vs. 20–27 in *A. lasallei*, 23–29 in *A. lehmanni*, and 24–27 in *A. loveridgei*; seven to nine teeth with two postdiastemal teeth; hemipenis moderately bilobed). Other than differences in color pattern (see above), *A. microrhynchus* differs from *A. natans* in having 32–34 subcaudals in males, three infralabials contacting chinshields, six or seven (5+1 or rarely 6+1) maxillary teeth, long tails in males, and hemipenis strongly bilobed with distinct moderately hooked spines on the intrasulcar region of the capitulum (vs. 23–31 subcaudals in males, four infralabials contacting chinshields, usually seven maxillary teeth [5+2], moderate tail size in males, and hemipenis moderately bilobed lacking hooked spines on intrasulcar region).

Description of Neotype.—Adult male, 275 mm SVL, 54 mm CL (19.6% of SVL); head rounded in dorsal view, flattened in lateral view, 10.2 mm long (3.7% of SVL), 6.6 mm wide; head not distinct from body; snout rounded in dorsal view, fairly truncated in lateral view; rostrum–orbit distance 4.1 mm (40.2% of head length); nostril–orbit distance 2.4 mm (23.5% of head length); intra-orbital distance 4.2 mm (63.6% of head width); body subcylindrical, body diameter 8.4 mm (3.1% of SVL); belly flattened; tail moderately long, with terminal spine rhomboid, slightly acumi-

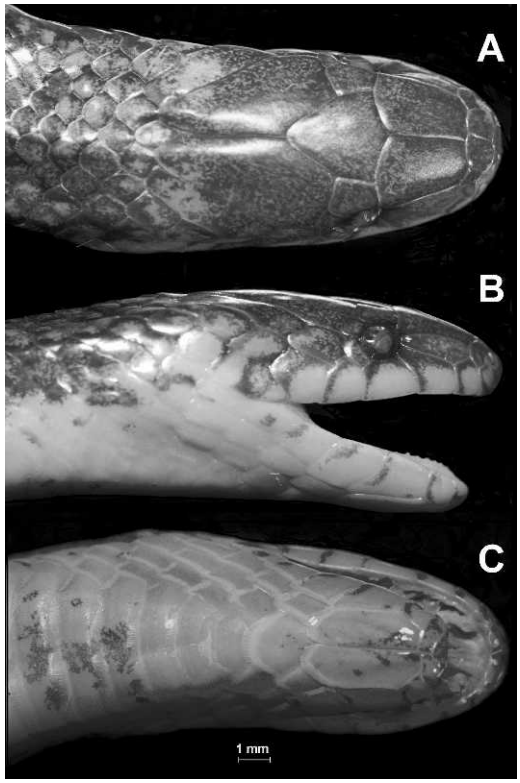

FIG. 3.—Dorsal (A), lateral (B), and ventral (C) views of head of the *Atractus microrhynchus* (MUSM 22829).

nate, and conical; rostral subtriangular, wider (1.8 mm) than high (1.3 mm), visible from above; internasal longer (1.0 mm) than wide (0.8 mm wide); internasal suture sinistral regarding prefrontal median suture; prefrontal longer (2.5 mm) than wide (2.3 mm); frontal triangular, approximately as wide (2.5 mm) as long; supraocular irregularly trapezoidal, longer (1.4 mm) than wide (1.1 mm); parietal approximately twice as long (4.4 mm) as wide (2.6 mm); nasal divided; prenasal approximately twice as high (0.7 mm) as long, contacting rostral, internasal, first supralabial, and postnasal; postnasal approximately twice as high (1.0 mm) as long (0.5 mm), contacting prenasal, prefrontals, loreal, and second pair of supralabials; moderately long loreal (2.3 mm long and 0.9 mm high); loreal contacting eyes, prefrontals, nasals, and second to third supralabials; eye diameter 1.1 mm; pupil round; two postoculars, upper postocular pentagonal and slightly higher (0.8 mm) than lower postocular, contacting eye, supraocular, parietal and anterior temporal, lower postocular slightly longer (0.7 mm) than upper, contacting eye, fourth and fifth supralabial and anterior temporal; 1+2 temporals; anterior temporal longer (1.5 mm) than high (0.9 mm), contacting parietal, fifth to sixth supralabials, postoculars, and posterior temporals; upper posterior temporal elongate (3.4 mm long), approximately four times longer than wide; lower posterior temporals not fused and similar in size and shape to anterior temporal; seven supralabials, third and fourth contacting orbit; second supralabial higher than first and lower than third; sixth supralabial higher and seventh supralabial longer than remaining supralabials; symphisial triangular, approximately twice wider (1.3 mm) than long (0.4 mm); seven infralabials, first three pairs contacting chinshields; first pair of infralabials in contact behind symphisial, preventing symphisial/chinshield contact; chinshields approximately four times as long (3.6 mm) as wide (1.2 mm); 17-17-17 smooth dorsal scales rows, lacking apical pits and supra-anal tubercles; three gular scale rows between last supralabial and preventral; three preventral scales; 147 ventral scales; anal plate single; 36 subcaudal scales. Maxilla arched in dorsal view, curved on anterior and flattened on median to posterior portion; maxillary arch with six prediastemal and single postdiastemal teeth; prediastemal teeth angular in cross section, robust at base, narrower at apices, curved posteriorly; first five teeth large, moderately spaced, similar in size; sixth prediastemal tooth reduced in size; maxillary diastema moderate, with space shorter than distance between fifth and sixth teeth; postdiastemal tooth slightly smaller than sixth prediastemal one; lateral process of maxilla poorly developed.

Coloration in Preservative of Neotype.—Dorsum of head uniform brown to posterior region of parietals; latero-posterior portion of parietals and temporal region pale brown, forming a barely distinct incomplete light band; head background brown to dorsal margin of supralabials, except for pale brown spots on temporal region; anterior temporal with pale brown spots; lower posterior temporal and posterior portion of seventh supra-

labial creamy, constituting dorsal limits of dark postorbital stripe; supralabials mostly creamy, with invasion of brown pigment on posterior suture between scales; brown postorbital stripe crossing posterior region of sixth and mid portion of seventh supralabial, forming the descending portion of stripe; infralabials mostly creamy with brown dots toward the center or posterior edges of some scales; mental region creamy with few brown dots on anterior portion of chinshields; gular series and preventrals with small irregular brown marks; ventral ground color creamy scattered with dark brown marks; first 40 ventrals predominantly creamy with few brown irregular dots disposed toward the side of the scales; after that point dots concentrated laterally forming irregular brown blotches on lateral region of ventral scales, except for lateral-most edge of ventrals creamy; brown dots concentrated toward posterior region of body; creamy paraventral margin evident along all of body; ventral surface of tail dark brown suffused with few creamy dots concentrated on margins of subcaudals. Dorsal ground color light brown with 44 well-defined paired dark brown blotches (one scale long); blotches with indistinct creamy borders and disposed almost linearly on each side of paravertebral region, extending from fourth to fifth or fifth to sixth dorsal scale rows; first dorsal scale rows with invasion of creamy pigment on each side of body (Fig. 1).

Color Variation.—The color pattern of the other Ecuadorian specimen is highly similar to that of the neotype, except that the lowest dorsal blotches are closer to each other, at some points forming a discrete lateral broken line; also the posterior half of the venter is darker, becoming almost completely dark brown because of the accumulation of dark dots; and the ventral surface of tail is completely dark brown. Peruvian specimens of *A. microrhynchus* are similar to the neotype, with MUSM 22829 differing from it in the following aspects: distinct occipital light band, with entire lateral portion of parietals and first dorsal series pale brown; dark brown descending stripe and brown marks between supralabials and infralabials sutures more conspicuous; first 30 ventral scales more scattered with brown dots; creamy paraventral margin evident along all of body; posterior region of venter with more invasion of creamy blotches; creamy pigment on ventral surface of tail reaching median subcaudal sutures; dorsum with 44/46 (right and left sides, respectively) well-defined paired black blotches (two to three scales long and one to three scales high); blotches well spaced in the first half of body (interspaces three to four scales long) and next to each other (interspaces one to two scales long) in the posterior region; blotches pale brown bordered (half to one scale wide), covering five to seven dorsal scale rows (Figs. 2 and 3).

Hemipenial Variation.—Retracted organ bifurcates at eighth and extends to the level of 15th subcaudal. Hemipenis strongly bilobed, slightly semicapitate, and semicalyculate; lobes clearly distinct from capitulum and longer than hemipenial body on sulcate and similar in size to it on asulcate side; lobes attenuate, centrifugally oriented, with rounded apices; left lobe longer than right; lobes covered with moderate alary spines on basal portion and concentrated spinulate calyces from the base increasing toward apices of lobes; lobes of asulcate side of hemipenis forming barely defined longitudinal crests; capitular groove indistinct on sulcate, evident on lateral region, and barely distinct on asulcate side of organ; capitulum located above bifurcation of sulcus spermaticus; capitulum entirely retracted on asulcate side of hemipenis and longer than hemipenial body on sulcate side; capitulum with inverted "V" shape on sulcate to asulcate side; intrasulcar region of capitulum with four enlarged, narrow, hooked spines disposed in longitudinal series; nonlobular portion of capitulum with spinulate calyces and moderate alary spines; sulcus spermaticus bifurcates on basal portion of hemipenial body; after sulcus spermaticus division three large hooked spines, on each side of sulcus spermaticus ramus, delimit the proximal margin of capitular crotch; branches of sulcus spermaticus centrolinearly oriented, running to tips of lobes; sulcus spermaticus margins stout and moderately expanded before lobes division and widely expanded along each lobe; sulcus spermaticus bordered with spinules from basal portion of organ to lobular region;

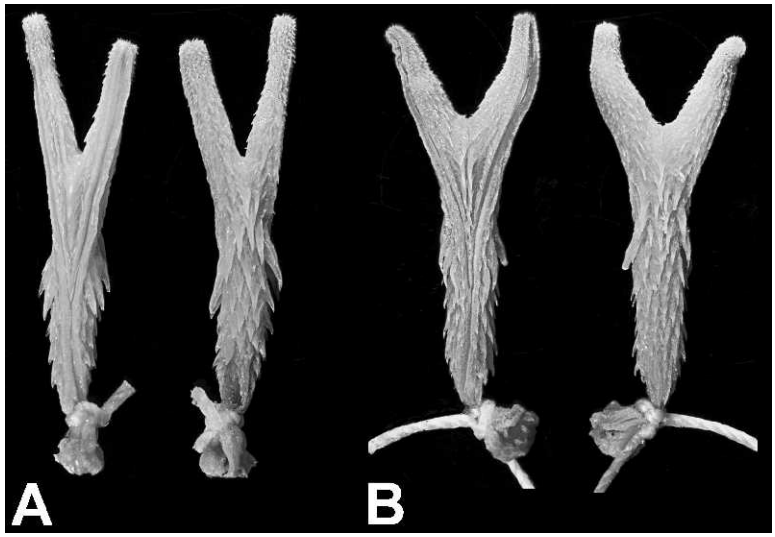

FIG. 4.—Sulcate (left) and asulcate (right) sides of the hemipenis of the holotype of *Atractus microrhynchus* (A) MUSM 22829 and (B) MUSM 22830.

asulcate side of organ with two large hooked spines just above division of lobes; four large hooked spines disposed in inverted "V" shape delimit the capitulum border on asulcate to lateral side of hemipenis; hemipenial body subelliptical, uniformly covered with moderate hooked spines; basal naked pocket absent; basal portion of hemipenis uniformly covered with longitudinal plicae. The hemipenis of MUSM 22830 is very similar to that of MUSM 22829, differing from it in the following aspects: lobes with similar length; eight enlarged, narrow, hooked spines on intrasulcar region; large hooked spines bordering capitulum on lateral and asulcate side of organ relatively smaller (Fig. 4).

Quantitative Variation.—Ecuadorian and Peruvian specimens have seven supralabials, third and fourth contacting orbit; seven infralabials, first three contacting chinshields; three gular scale rows; three preventrals; two postoculars; and 1+2 temporals. Variation occurs in the number of maxillary teeth; the second Ecuadorian specimen has 6+1 maxillary teeth on its left side, like the neotype, but it has 5+1 maxillary teeth on its right side, similar to the Peruvian specimens. Juvenile male (AMNH 108943): 146 mm SVL, 57 mm TL; 143 ventrals, 35 subcaudals. Adult male (MUSM 22829): 293 mm SVL, 53 mm TL; tail 18.1% of SVL, 150 ventrals, 34 subcaudals, retracted hemipenis extends to the level of 15th subcaudal. Adult male (MUSM 22830): 288 mm SVL, 52 mm TL; tail 18% of SVL, 146 ventrals, 32/33 subcaudals, retracted hemipenis extends to the level of 13th subcaudal.

Distribution.—Pacific lowlands from central western Ecuador to northwestern Peru. Known from three localities in Ecuador: Guayaquil, Guayas Province; Río Palenque, Los Ríos Province; and Buenaventura, El Oro Province; and one locality in Peru: Cerros de Amotape National Park, Tumbes region, Peru. *Atractus microrhynchus* is apparently endemic to Seasonal Evergreen Forests in the West Ecuadorian Region, where it is known to occur between 0- and 800-m elevation (Fig. 5). The West Ecuadorian Region is a biogeographic zone recently defined for the highly Seasonal Evergreen Forests that extend along the Pacific lowlands and foothills of the Andean Cordillera Occidental in western Ecuador and extreme northwestern Peru. Previously considered just as a transition zone between the Chocoan and Tumbesian biogeographic regions, recent studies have revealed that several endemic species of animals and plants are restricted to this region (Cisneros-Heredia, 2006, 2007; Cisneros-Heredia and Yánez-Muñoz, 2007). The West Ecuadorian

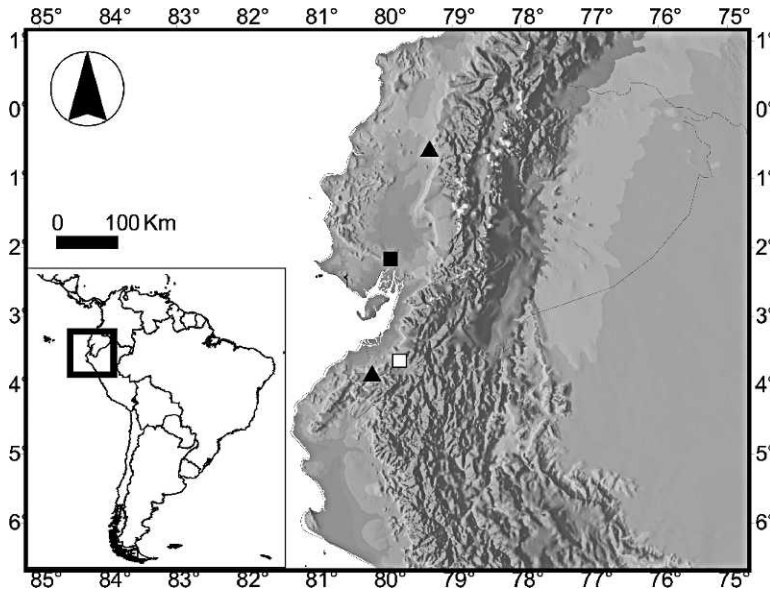

FIG. 5.—Geographical distribution of *Atractus microrhynchus*. The solid square represents the original locality of the holotype of *A. microrhynchus* from Cope (1868), and the open square represents the current type locality of the *A. microrhynchus*. Triangles represent the additional records of *A. microrhynchus*.

Region was originally thought to be confined to western Ecuador (see Cisneros-Heredia, 2006), but it also includes the small area reported as Equatorial Dry Forests by Brack (1986) in the Tumbes area. The original type locality of *A. microrhynchus* was reported by Cope (1868) as Guayaquil, which seems to be correct. At the time of the Orton Expedition, the port city of Guayaquil was surrounded by hills covered with Seasonal Evergreen Forests. Guayaquil is between Río Palenque (190 km away) and Buenaventura (150 km away); both Río Palenque and Guayaquil are located in the Guayas–Daule–Babahoyo rivers basin.

Remarks.—Unfortunately, the holotype of *A. microrhynchus* is lost. To complicate matters, the original description provided by Cope (1868) was brief, without any illustration of the holotype, and no additional species of *Atractus* other than *A. multicinctus* and *A. paucidens* Despax, 1910 have been reported on the Pacific lowlands of Ecuador (Savage, 1960; Passos et al., 2009e). That Cope (1870), in a subsequent study, reported a supposed specimen of *A. microrhynchus* from Pebas in Peruvian Amazonia suggests that a population with a color pattern similar to that of *A. microrhynchus* occurs in the upper Amazon basin. Regrettably, this specimen from Pebas was never catalogued in the Academy of Natural Sciences of Philadelphia and is also currently lost (N. Gilmore, personal observation). Dixon and Soini (1977, 1986) indicated that 50% of the specimens they referred to *A.* cf. *microrhynchus* exactly match Cope's original description. In this matter we disagree, and we quote Cope's description of coloration for later comparisons: "Coloration like that of *Tantilla* Baird and Girard, 1853. Above dark brown, beneath pale brown, with a faint line along the margins of the gastrosteges. Top of head blackish, brown behind; a partially complete yellow collar, which widens at the angle of the jaws. A deep brown band from eye to angle of mouth; upper labials yellow brown edged."

Passos et al. (2009e) pointed out that the original description of *A. microrhynchus* is inadequate to distinguish it from many *Atractus* that have 17 scale rows and a uniform body color pattern. Cope's mention of a dark brown cephalic cap with an incomplete yellow collar, nearly uniform dorsum, and belly with lines on lateral region

of ventral scales led Passos et al. (2009e) to speculate that *A. microrhynchus* was perhaps morphologically similar to *A. collaris* Peracca, 1897 and other apparently related species (but see Prudente and Passos, 2008, 2010). However, all of these features in the specimens found in the Pacific lowlands of Ecuador and Peru are only superficially similar to *A. collaris* (sensu stricto). In fact, *A. microrhynchus* as defined herein differs from *A. collaris* and their relatives in several aspects (e.g., in lacking apical pits and supra-anal tubercles in males, incomplete and conspicuous occipital white band, conspicuous lateral black stripes on lateral portion of belly and distinct postorbital stripe).

Ken Miyata and Frances Irish identified in July 1979 a specimen of *Atractus* (AMNH 108943) collected on the Pacific coast of Ecuador as belonging to *A. microrhynchus*. Unfortunately, because of Ken Miyata's death, they never published their discovery. In 2002, one of us (DC-H) examined that specimen and its accompanying notes written by K. Miyata and F. Irish; that specimen is clearly conspecific with the specimens found recently in other localities of the Pacific lowlands of Ecuador and Peru. The examination of recently obtained specimens on the Pacific lowlands of Ecuador and Peru corroborates Cope's description, and Miyata and Irish's identification allows us to associate them with *A. microrhynchus*. The specimens reported herein have a dark brown cephalic cap interrupted on the parietal region by cream transversal bands without contact in midline and a more (DHMECN 3008, AMNH 108943, and MUSM 22830) or less (MUSM 22829) distinct paler band on the occipital region of the head; one of the individuals (MUSM 22829) has a nearly uniform pale brown dorsum, whereas the others have distinct black blotches; all specimens have cream ventral ground color with well-defined irregular brown marks interrupted on the lateral portion of each ventral scale, forming barely defined paraventral lines (better described as cream lateral area by interruption of dark paraventral blotches) and a conspicuous postorbital black stripe reaching last supralabials (Figs. 2 and 3). The only feature in disagreement with the original description is the number of infralabials contacting chinshields (three on the new specimens). Even though the holotype of *A. microrhynchus* might indeed be unusual among *Atractus* in having two infralabials in contact with the chinshields, we also are aware of the possibility that Cope did not count the first pair of scales behind the symphysial as infralabials (a usual *Atractus* feature; see Passos et al., 2009e). Because of the complex taxonomic history of *A. microrhynchus* discussed above and the difficulties that many authors have had in recognizing this species after its original description (including Cope), we believe that a neotype designation is required to clarify the taxonomic status of the species. In doing so, we follow all qualifying conditions of article 75.3 of the ICZN (1999), and we select the specimen that is closest to the type locality as the neotype of *A. microrhynchus*.

Atractus natans *Hoogmoed and Prudente, 2003* *(Figs. 6–8; Table 1)*

Atractus badius Dixon and Soini, 1977; Milwaukee Publ. Mus. Contrib. Biol. Geol. 12:33.

Atractus cf. *microrhynchus* Dixon and Soini, 1986; Milwaukee Public Museum.

Atractus sp. Bartlett and Bartlett, 2003: Fig. 205B (photograph of a specimen in life).

Atractus natans Hoogmoed and Prudente, 2003; Zool. Méd. Leiden 77:428.

Atractus emersoni Silva, 2004; Rev. Acad. Col. Cien. Exa. Fis. Nat. 108:423. New synonymy.

Holotype.—Adult female, MPEG 18836, collected on 1 August 1994 by M. S. Hoogmoed and T. C. Ávila-Pires near confluence of Apara and Mamirauá rivers (03°02′S, 64°51′W, sea level), Estação Ecológica de Mamirauá, Melgaço, state of Pará, Brazil (specimen examined).

Paratypes.—Juvenile female (MPEG 18838), same data as holotype; adult female (RMNH 35530), sand bank on the left margin of Rio Mamirauá (03°04′S, 64°48′W, sea level), Estação Ecológica de Mamirauá, Melgaço; adult female (MPEG 20213), Estação Científica Ferreira Penna (01°43′S, 51°32′W, sea level), FLONA de Caixuanã, Rio Curuá, Melgaço (all specimens examined except RMNH 35530).

FIG. 6.—Dorsal (A) and ventral (B) views of the specimen of *Atractus natans* (TCWC 42800) from Mishana, department of Loreto, Peru.

Referred specimens.—Adult females, ICN 10097 (holotype of *A. emersoni*) and ICN 10098 (paratype of *A. emersoni*) collected May 2001 at locality of Boa Vista, Municipality of Benjamin Constant (04°25′S, 70°02′W, ca. 65 m asl), Brazil; adult male ICN 10099 (paratype of *A. emersoni*) collected at Quebrada de los Lagos, Municipality of Leticia (04°13′S, 69°56′W, ca. 83 m asl), Colombia; and subadult ICN not catalogued, from unknown locality, but apparently donated by J. S. Haad from Colombian Amazonia (J. D. Lynch, personal observation). Sixteen specimens all from department of Loreto in Peru: Iquitos (03°44′53″S, 73°14′50″W, ca. 100 m asl): TCWC 39063; Zona Reservada Allpahuayo-Mishana (ca. 03°53′S, 73°27′W, 100 m asl): TCWC 42792–801, 47803–04, MCZ 151769; Moropón (ca. 03°27′S, 73°32′W, ca. 100 m asl): TCWC 39064; Río Maniti: TCWC 52502.

Diagnosis.—*Atractus natans* is distinguished from all congeners by the following combination of characters: (1) 17-17-17 smooth dorsals; (2) usually two postoculars; (3) moderately long loreal; (4) temporals 1+2; (5) usually seven supralabials, third and fourth contacting orbit; (6) usually seven infralabials, first four contacting chinshields; (7) five or six maxillary teeth; (8) four gular scale rows; (9) usually four preventrals; (10) 154–163 ventrals in females, 136–152 in males; (11) 18–26 subcaudals in females, 23–31 in males; (12) dorsum dark brown to black generally with distinct irregular black blotches on flanks, juveniles and subadults with cream occipital band; (13) venter mostly black, with lateral region of ventral scales paler (beige to creamish brown); (14) moderate body size in females (390 mm SVL), small (250 mm SVL) in males; and (15) short tail in females (8.8–10.6% of SVL), moderate long (13.5–15.2% of SVL) in males.

Comparisons.—Among all congeners, *A. natans* shares just with *A. tamessari* Kok, 2006 ca. 154–163 ventrals in females, four infralabials contacting chinshields, dorsum dark brown to black with dots or blotches on the flanks, venter mostly black, and five to six maxillary teeth. *Atractus natans* differs from *A. tamessari* in having 17 dorsal scale rows,

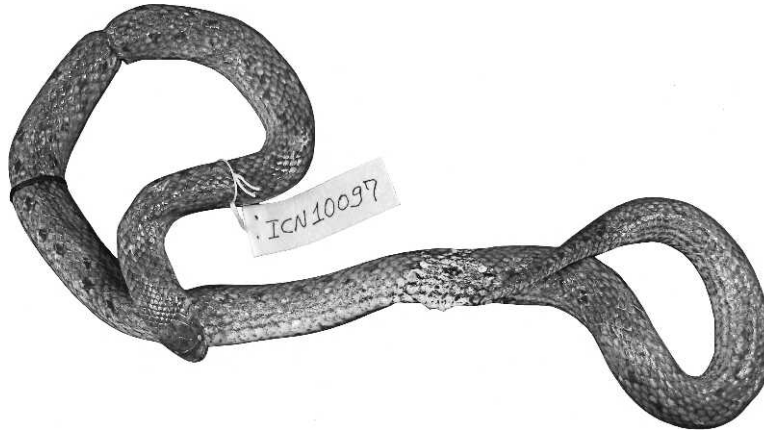

FIG. 7.—Dorsal view of the holotype of *Atractus emersoni* (ICN 10097).

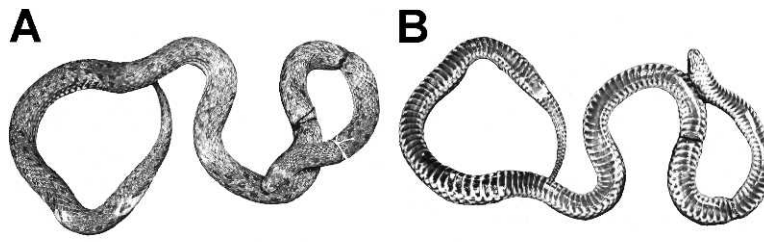

FIG. 8.—Dorsal (A) and ventral (B) views of the paratype of *Atractus emersoni* (ICN 10098).

seven supralabials, paler occipital band in juveniles and subadults, dorsum usually with distinct dorsal blotches white bordered (vs. 15 dorsal scale rows, usually eight supralabials, lacking paler occipital band, dorsum generally uniform black, occasionally scattered with irregular red dots).

Description.—Head approximately twice as long as wide, flattened in lateral view and rounded in dorsal view; slightly distinct from body; snout truncate in lateral view, slightly rounded in dorsal view; rostral subtriangular in frontal view, visible in dorsal view, approximately twice as wide as high; internasal wider than long; internasal suture sinistral with respect to prefrontal suture; prefrontal approximately as long as wide; supraocular subrectangular, approximately twice as long as wide; frontal pentagonal or subtriangular, as long as wide; parietal approximately twice longer than wide; nasal divided; nostril located between prenasal and postnasal; prenasal two or three times as high as long, contacting rostral, internasal, first supralabial, and postnasal; postnasal as long as wide, contacting prenasal, prefrontals, loreal, and second pair of supralabials; moderately long loreal; loreal contacting eyes, prefrontals, nasals, and second to third supralabials; pupil round; usually two postoculars; upper postocular slightly longer, and lower slightly higher; temporals 1+2; anterior temporal twice as long as high, contacting parietal, fifth to sixth supralabials, postoculars, and posterior temporals; upper posterior temporals fused, shield four times longer than wide; seven supralabials, third and fourth contacting orbit; second supralabial higher than first and smaller than third; sixth higher and seventh longer than remaining supralabials; symphisial semicircular, approximately six times as wide as long; seven infralabials, first four pairs contacting chinshields; first pair of infralabials in contact behind symphisial, preventing symphisial/chinshield contact; chin shields twice as long as wide; four gular scale rows; usually four preventrals; 17-17-17 dorsal scale rows, lacking apical pits and supra-anal tubercles; caudal spine moderately long, conical, and slightly acuminate. Maxilla arched in dorsal view, with four or five prediastemal and two postdiastemal teeth; prediastemal teeth angular in cross section, robust at base, narrower at apices, curved posteriorly; first five teeth large, moderately spaced, decreasing gradually in size posteriorly; maxillary diastema short,

TABLE 1.—Variation in the meristic characters of the *Atractus natans*. Samples referred below as *Atractus emersoni* and *Atractus natans* represent the type series for each taxon respectively, and specimens from the Iquitos region, previously identified as *A. badius* (Dixon and Soini, 1977) or *A.* cf. *microrhynchus* (Dixon and Soini, 1986), also are *A. natans* as defined here.

Sample	Sex	Ventrals	Subcaudals	Supralabials	Infralabials	Infralabials contacting chinshields	Maxillary teeth
A. natans	Male $n = 1$	136	23	7	7	4	5–6
	Female n=2	158–163	19–21				
A. emersoni	Male $n = 1$	146	29	7	7	4	5
	Female $n = 2$	155–156	21–23				
Iquitos region	Male $n = 10$	144–152	25–31	7	7	4	5–6
	Female $n = 6$	159–162	18–26				

with space equivalent to size of fifth prediastemal tooth; postdiastemal teeth half size of fifth prediastemal tooth; lateral process of maxilla poorly developed.

Juvenile Color in Preservative.—Dorsum of head dark brown to black, except for snout (rostral, internasals, and anterior portion of prefrontals) and occipital band (usually complete) cream to light brown; large occipital band, reaching anterior region of parietals, posterior temporals, and occipital scales; background of head dark brown to black with snout region (rostral, nasals, and loreal) cream to light brown; anterior supralabials (first and second) cream, remaining supralabials mostly black with cream dots concentrated on anterior portion of each scale; infralabials and chinshields usually black, with little invasion of pale pigment (creamish yellow to brown); gular region creamish yellow scattered with black dots; venter usually cream anteriorly, scattered with disperse dark brown dots or blotches; mid to posterior region of belly tends to become uniformly black by collapsing black blotches on median region of ventral scales; ventral surface of tail uniformly black; dorsal ground color of body dark brown with 40–60 irregular black blotches pale (cream to light brown) on flanks; irregular blotches (one or two scales long) covering fifth to sixth dorsal scale rows; first three dorsal scale rows occasionally with dispersed black dots (half or one scale long); first dorsal scale row beige to pale brown, usually with reticulate pattern of cream below black dots.

Adult Color in Preservative.—Adults with snout and occipital pale regions of head darker than juvenile (beige to dark brown); belly mostly black, except at lateral margin of ventral scales creamish brown to beige; dorsum usually uniformly black or with poorly distinct blotches along body.

Color in Life.—Dorsal ground color of body black to dark reddish brown, usually with black pale (light reddish) bordered blotches; mental region cream, with pale reddish brown irregular blotches; belly mostly black, with lateral margins of ventral scales pale brown (beige); median to posterior region of belly uniformly black.

Hemipenis.—Retracted organ bifurcates at sixth and extends to level of seventh subcaudal. Hemipenis moderately bilobed, barely semicapitate, and semicalyculate; lobes distinct and restricted to distal region of capitulum; lobes approximately conical, with distinct length; right lobe (same side of naked pocket) always longer than left; lobes slightly smaller than proximal region of capitulum; capitulum uniformly covered with concentrated spinulate calyces; capitular crotch evident on both sides of hemipenis, more developed on asulcate and barely defined on sulcate side of organ; capitulum located below sulcus spermaticus bifurcation, delimited on proximal region by moderate hooks; capitulum slightly retracted on median region of asulcate side and equivalent to hemipenial body on sulcate side of hemipenis; sulcus spermaticus divides on middle of organ above distal portion of hemipenial body; sulcus spermaticus branches centrifugally oriented, reaches apices of lobes; margins of sulcus spermaticus narrow and stout, bordered with spinules from base to tip of lobes; hemipenial body subcilindrical, uniformly covered with small to moderate hooked spines; largest spines concentrated on lateral region of sulcate and medial portion of asulcate side adjacent to capitulum; basal naked pocket located in the right side of organ, extending to proximal region of hemipenial body; basal region of hemipenis with longitudinal plicae and dispersed spinules.

Quantitative Variation.—Largest males 250 mm SVL, 38 mm TL; largest female 385 mm SVL, 41 mm TL; tail 13.5–15.2% ($n = 2$) of SVL in males, 8.8–10.6% ($\bar{X} = 9.8$, SD= 0.75; $n = 4$) of SVL in females; 136–152 ($\bar{X} = 144.5$, SD= 6.6; $n = 4$) ventrals in males, 154–163 ($\bar{X} = 158.1$, SD = 3.4; $n = 7$) in females; 23–31 ($\bar{X} = 27.2$, SD = 3.6; $n = 4$) subcaudals in males, 18–26 ($\bar{X} = 21.5$, SD = 2.7; $n = 7$) in females; 7 ($n = 44$ sides) or 8 ($n = 2$ sides) supralabials; 7 ($n = 44$ sides) or 8 ($n = 2$ sides) infralabials; 1 ($n = 4$ sides) or 2 ($n = 42$ sides) postoculars; 3 ($n = 1$) or 4 ($n = 6$) preventrals; 6–9 ($\bar{X} = 7.9$, SD = 0.7; $n = 14$ sides) dorsal scale rows at the level of second subcaudal; 5 ($n = 11$ sides) or 6 ($n = 3$ sides) maxillary teeth; retracted hemipenis extends to the level of sixth or seventh subcaudal ($n = 2$).

Distribution.—Amazon rainforest south to the Amazon River, from Mishana (03°47′S,

73°30′W) department of Loreto, Peru, east to Melgaço (01°47′S, 50°44′W), state of Pará, Brazil. *Atractus natans* occurs from sea level to 100-m elevation (Fig. 9).

Remarks.—Although Cope's description of *A. microrhynchus* was brief, there are notable differences between it and characteristics of the specimens from Iquitos previously referred to *Atractus badius* (Dixon and Soini, 1977) or *Atractus* cf. *microrhynchus* (Dixon and Soini, 1986). Most notably, Cope (1868) did not mention any pattern overlaid on the brown dorsal coloration of *A. microrhynchus*. That he described the coloration of *A. microrhynchus* as "like that of *Tantilla*" may indicate as well that the dorsal coloration of the holotype of *A. microrhynchus* was uniform brown (with a black cephalic cap) as in many species of *Tantilla*. However, the presence of black blotches on the flanks is variable (more or less conspicuous) among the specimens herein referred to *A. microrhynchus*, and also in the Amazonian populations of *A. natans* (Hoogmoed and Prudente, 2003) and *A. emersoni* (Silva, 2004; present study). As such, there are two possibilities: (1) the holotype of *A. microrhynchus* also would have barely distinct dorsal blotches as in MUSM 22829 (Fig. 2A) or (2) the specimen reported by Cope (1870) was uniformly dark brown or black, as are many individuals of *A. natans* and *A. emersoni* (Hoogmoed and Prudente, 2003; Fig. 7). This last possibility of melanistic individuals in the Amazon basin better explains why Cope (1870) referred another specimen to *A. microrhynchus* if the later was apparently not blotched.

The ventral coloration of *A. microrhynchus*, as described by Cope (1868), also differs from that observed in the specimens from the Amazon basin. In the latter specimens, the venter is usually black in the middle, with a cream lateral area or with dispersed blotches on the anterior region of belly (Figs. 6–8), whereas *A. microrhynchus* has a cream venter with irregular pale brown marks not collapsed in the middle of the belly at least on the anterior and mid portions of the body (Figs. 1–3). Although the specimens from the Amazon basin often have some dark spots or blotches in the postocular region, these spots never form a stripe as described by Cope in *A. microrhynchus* (Figs. 6–8), which was likely conspicuous and well defined to be noted by Cope in his brief description. Based on the above-mentioned observations, we consider the specimens from Iquitos, herein referred to *A. emersoni* or *A. natans* (see below), to be different from *A. microrhynchus*. The less likely possibilities that Cope's description of

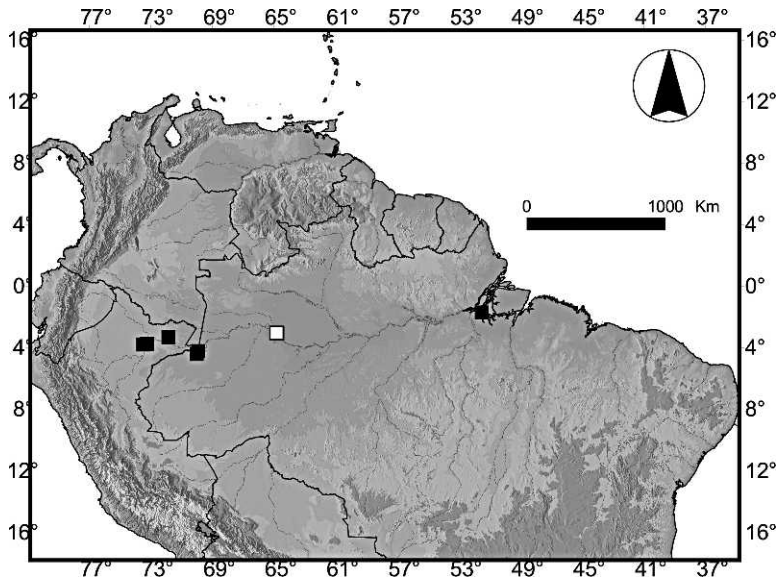

FIG. 9.—Geographical distribution of *Atractus natans*. Open squares represent the type locality of the species.

A. microrhynchus is inaccurate in terms of coloration, and that the type locality is in error (as has apparently been noted with other material from the Orton expedition), are not supported (see Passos et al., 2009e, for additional comments in this respect).

The examination of the type series and additional specimens of *A. emersoni* and *A. natans* revealed that all meristic, morphometric, color pattern, and hemipenial features largely overlap; the variation in these species also overlaps that of the specimens previously reported by Dixon and Soini (1977, 1986) from the Iquitos region (Table 1). Whereas mature individuals of *A. natans* usually display a melanistic pattern with barely distinct blotches that differ from the holotype of *A. emersoni* (a subadult specimen), a paratype of *A. emersoni* (ICN 10099) shows poorly distinct blotches on the dorsum like those on the holotype of *A. natans* (Hoogmoed and Prudente, 2003; Figs. 6–8). Although Silva (2004) did not describe a pale occipital band in the juvenile specimens of *A. emersoni*, examination of the type series of the species revealed the presence of a darker pale (beige) band on the occipital region and also conspicuous pale blotches on the snout region of *A. emersoni* (Figs. 6–8); both characteristics are evident in most individuals of *A. natans* (see Hoogmoed and Prudente, 2003). Apparently, the minor or major contrast between the occipital band and ground color is correlated with ontogenetic changes of coloration or melanism (this question cannot be addressed with the available sample). Even so, according to our sample, adults of both species tend to become darker in the course of their ontogeny. Furthermore, the hemipenis description of *A. emersoni* provided by Silva (2004: Fig. 23) was not accurate with respect to capitation structures. The examination of this organ revealed that it is in fact semicapitate and semicalyculate (sensu Zaher, 1999), as was described by Hoogmoed and Prudente (2003: 434, 436) for *A. natans*. Finally, as found for most Amazonian congeners (Hoogmoed, 1980; Cunha and Nascimento, 1983; Martins and Oliveira, 1993; Passos and Fernandes, 2008; Prudente and Passos, 2008), *A. natans* also has a wide range of distribution along the biome (see Hoogmoed and Prudente, 2003). Therefore, for the reasons discussed, *A. emersoni* is herein relegated to the synonymy of *A. natans*.

Discussion

Passos et al. (2009e) proposed the *A. multicinctus* species group to accommodate Pacific lowland *Atractus* that share a unique combination of morphological characters for the genus. They pointed out that the strongly bilobed hemipenis and the basal bifurcation of the sulcus spermaticus might constitute derived character states in the evolution of certain species of the "goo-eaters" clade of the Dipsadini (P. Passos, personal observation). *Atractus microrhynchus* shares both hemipenial conditions, as well as the presence of narrow, enlongated, hooked spines in the intrasulcar region, with members of the *A. multicinctus* species group (*A. boulengerii* Peracca, 1896; *A. clarki* Dunn and Bailey, 1939; *A. medusa* Passos, et al., 2009e; and *A. multicinctus*). However, in terms of external morphological characteristics (meristic, morphometric, and color pattern traits), *A. microrhynchus* is most similar to the Andean *A. dunni*, *A. ecuadoriensis*, and *A. occidentalis*, and to the Pacific lowland *A. echidna* and *A. iridescens* (last two from the lowland *A. paucidens* species group).

In fact, using the key for Pacific lowland *Atractus* provided by Passos et al. (2009e), *A. microrhynchus* falls at the sixth step in the key. However, *A. microrhynchus* differs from *A. iridescens* and *A. paucidens* (alternative steps in that dichotomy) in the number of ventral scales; however, see the comparisons section of this study for additional diagnostic characters among these taxa. Although *A. microrhynchus* is morphologically most similar to the Andean *A. dunni*, *A. ecuadoriensis*, and *A. occidentalis*, the taxonomic status of the latter forms will be discussed in a subsequent paper. Most of the external morphological characters shared by *A. microrhynchus* and the aforementioned taxa are widespread and likely homoplastic features (e.g., color pattern and relative tail size) that may occur individually or in some combination in several other species or species groups in the genus. Because a robust phylogenetic hypothesis is still lacking for *Atractus*, at this

moment we prefer to use the hemipenial features to infer the putative affinities of *A. microrhynchus*. Therefore, we allocate *A. microrhynchus* to the *A. multicinctus* species group on the basis of shared unusual hemipenial characters such as strongly bilobed organ; basal bifurcation of the sulcus spermaticus; and the presence of elongated, narrow, hooked spines in the intrasulcar region. Finally, because there are ongoing taxonomic studies on the Amazonian species of *Atractus*, we refrain from allocating *A. natans* to the currently proposed species groups.

Acknowledgments.—We are deeply indebted to N. Gilmore (ANSP) for information about the holotype of *R. microrhynchum* and about specimens collected by the Orton Expedition in Amazon basin. We thank F. Sornoza and the Jocotoco Foundation for collecting the neotype of the *A. microrhynchus* and allowing access to the Buenaventura reserve; H. Yánez-Muñoz for sharing information on the type locality; and R. Cadenillas and V. Pacheco for collecting the Peruvian specimens of *A. microrhynchus* and sharing field data. We thank three anonymous reviewers for commentaries and suggestions on an early version of the manuscript. We thank the following curators (in alphabetical order) for allowing examination of specimens under their care: J. Córdova (MUSM), J. Dixon and L. Fitzgerald (TCWC), J. Lynch (ICN), A. Prudente (MPEG), and M. H. Yánez-Muñoz (DHMECN). For financial support, PP is grateful to Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Pró-Reitoria de Pós-Graduação e Pesquisa da Universidade Federal do Rio de Janeiro (PR-2/UFRJ), Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP; process 2011/50313-0), and Fundaão Carlos Chagas de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ) for financial support; and DC-H is grateful to Ma. Elena Heredia, Laura Heredia, the Research Training Program/Smithsonian Women's Committee of the National Museum of Natural History (Smithsonian Institution), and the Russell E. Train Education for Nature Program of the World Wildlife Fund.

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Accepted: 17 May 2012
Associate Editor: Christopher Raxworthy