Herpetologica, 58(2), 2002, 252–260

A NEW SPECIES OF *COLOSTETHUS* (ANURA: DENDROBATIDAE) FROM THE EASTERN SLOPES OF THE CORDILLERA ORIENTAL OF COLOMBIA

TARAN GRANT[1] AND MARÍA CRISTINA ARDILA-ROBAYO[2]

[1]*Division of Vertebrate Zoology, Herpetology, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024, USA; and Center for Environmental Research and Conservation, Columbia University MC5557, 1200 Amsterdam Ave., New York, NY 10027, USA*
[2]*Profesor Asociado, Instituto de Ciencias Naturales–Museo de Historia Natural, Universidad Nacional de Colombia Bogotá, Apartado Aéreo 7495, Santa Fe de Bogotá, Colombia*

ABSTRACT: We describe a new species of *Colostethus* from moderate elevations of Cuchilla los Picachos, a spur of the eastern slopes of the Cordillera Oriental of Colombia (Departamento de Caquetá). The new species is a small, diurnal, forest dweller characterized, in part, by lacking sexual dimorphism in ventral coloration; the throat, chest, and anterior belly of adults of both sexes are very dark brown or black. Adult males possess a patch of black, apparently glandular tissue on the ventral and medial surfaces of the distal extreme of the upper arm, just proximal to the elbow (="black arm band"), which is conjectured to be a unique synapomorphy of the *C. ramosi* species group. Species previously considered part of the *C. ramosi* group are *C. exasperatus, C. fascianiger, C. lehmanni,* and *C. ramosi.* In addition to the new species described herein, we recognize *C. cevallosi* as part of this group, which brings the total number of species in this clade to six. We also provide new Colombian locality records for *C. fascianiger, C. lehmanni,* and *C. ramosi.*

Key words: Anura; Dendrobatidae; *Colostethus*; New species; Taxonomy; Systematics; *Colostethus ramosi* group; Colombia; Andes; New records; Distribution

THE dendrobatid genus *Colostethus* is presently comprised of 109 recognized species, of which 47 occur in Colombia. Recent field work on the eastern slopes of the Cordillera Oriental in the Colombian Departamento de Caquetá yielded several specimens of a previously unknown species of the *Colostethus ramosi* group (Grant and Castro, 1998). In this paper, we describe the new species and discuss the systematics of related species.

MATERIALS AND METHODS

Measurements were taken to 0.1 mm with dial calipers. Unless otherwise noted, measurements and proportions are given only for adults, as determined by examination of gonads and secondary sex characters. Males with vocal slits on both sides of the mouth were scored as adult, those with only one were subadult, and those lacking slits on both sides were juvenile. Females with expanded, convoluted ovi-

ducts and enlarged ova were considered to be adult, those with only weakly expanded, non- or weakly convoluted oviducts and weakly differentiated ova were subadult, and those with small, undifferentiated ova and unexpanded, straight oviducts were juvenile. We report statistical summaries of measurements as the mean ± standard error. Institutional abbreviations are AMNH (American Museum of Natural History), IAvH (Instituto de Investigación de Recursos Biológicos Alexander von Humboldt), and ICN (Instituto de Ciencias Naturales, Universidad Nacional de Colombia). Records not found in Silverstone (1971), Coloma (1995), or Grant and Castro (1998) are included in Appendix I; readers are referred to those papers for the additional localities plotted in Fig. 3.

Species Description

Colostethus ***saltuarius*** sp. nov.

Holotype.—IAvH 6673 (field number MC 9617), an adult male, part of a series collected 26 November 1997 by M. C. Ardila-R., F. Escóbar, Y. Muñoz, F. Quevedo, and H. Villarreal at Cerro La Mica, Vereda de Cristo Rey, Inspección de Policía Guayabal, Municipio de San Vicente del Caguán, Departamento de Caquetá, Colombia, 1600 m, approximately 2° 50′ N, 74° 52′ W.

Paratopotypes.—ICN 42663–70, 43464–65, 43467, IAvH 6674, collected at the type locality by the aforementioned field party on 16–30 November 1997.

Paratype.—ICN 43466 taken by G. Amat on 15 October 1998 near Río Oso, Vereda de La Esperanza, Inspección de Policía Guayabal, Municipio de San Vicente del Caguán, Departamento de Caquetá, approximately 1200 m.

Etymology.—The trivial name is Latin, meaning a forester or one pertaining to the forest, in reference to the primary forest habitat of this species. It is used as a noun in apposition.

Diagnosis.—A small species (males to about 22 mm SVL, females to about 24 mm SVL); third finger not swollen in adult males; throat, chest, and anterior belly black in adult males and females (i.e., no chromatic sexual dimorphism; Fig. 1); black arm band (=black, apparently glandular tissue on ventral surface of distal end of upper arm) present in adult males; testes white (unpigmented); toes unwebbed; dorsolateral stripe absent; oblique lateral stripe present; ventrolateral stripe absent; median lingual process absent; cloacal tubercles absent.

Colostethus saltuarius differs from all other species of the *C. ramosi* group in that (1) the throat, chest, and anterior belly of adults of both sexes are black, and (2) the oblique lateral stripe is complete (groin to eyelid) but usually broken into a series of elongate spots; in the other species, the dark (gray or black) ventral coloration is confined to males (females are ventrally immaculate or have white throats and discrete white spots on a gray or black belly), and the oblique lateral stripe is either complete and solid (*C. cevallosi*, *C. fascianiger*, *C. lehmanni*, and *C. ramosi*) or absent or partial (*C. exasperatus*). *Colostethus saltuarius* also differs from *C. exasperatus* in lacking a dorsolateral stripe (present in *C. exasperatus*).

Among the other nine named species of *Colostethus* known to occur at moderate elevations of the Amazonian slopes of northern Ecuador and Colombia, all but *C. bocagei* differ from *C. saltuarius* in having clearly sexually dimorphic ventral coloration (throats of adult males gray or black, throats of females immaculate), as well as in the following points: *Colostethus picachos*, which occurs in sympatry with *C. saltuarius* (Ardila-Robayo et al., 2000, "1999"), differs from *C. saltuarius* in that Toes II–IV are basally webbed and finger III of adult males is swollen. *Colostethus pulchellus* and *C. subpunctatus* are both distinguished by their spotted venters. *Colostethus shuar* is much larger (to about 32 mm SVL) and has discrete dark spots on the chest. *Colostethus bocagei*, *C. fuliginosus*, and *C. palmatus* all have extensive toe webbing and are much larger (to at least 30 mm SVL). *Colostethus sauli* (new record for Colombia; see Appendix I) has webbing between all toes. *Colostethus kingsburyi* is a distinctive species with ven-

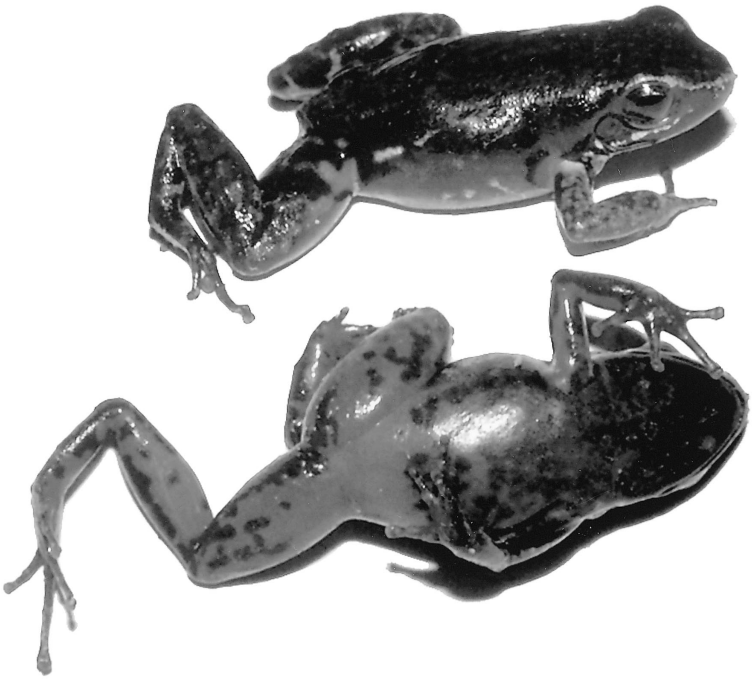

FIG. 1.—Dorsolateral and ventral views of *Colostethus saltuarius* in life. This specimen (ICN 42670) is a subadult female of 22.8 mm SVL.

trolateral, dorsolateral, and partial oblique lateral stripes.

Measurements of holotype (in mm).—SVL 21.4; forearm length from proximal edge of palmar tubercle to outer edge of flexed elbow 4.7; hand length from proximal edge of palmar tubercle to tip of third finger 5.7; tibia length from outer edges of flexed knee to heel 9.5; foot length from proximal edge of outer metatarsal tubercle to tip of fourth toe 8.9; head width between angle of jaws 7.1; head length diagonally from corner of mouth to tip of snout 6.7; eye length from posterior to anterior corner 2.7; eye to naris distance from anterior corner of eye to center of naris 2.0; distance between centers of nares 3.0; snout length from anterior corner of eye to tip of snout 3.5; interorbital distance 2.1; greatest diameter of tympanum 1.5.

Morphology.—Adult males 21.0–21.8 mm SVL (n = 3, $\bar{x}$ = 21.4 ± 0.23 mm); testes unpigmented (white), granular, two thirds length of eye in IAvH 6673 and ICN 43467, same length as eye in ICN 42663. All adult males with swollen patch of black, presumably glandular tissue at distal end of upper arm on ventral surface, just proximal to elbow, not extended distad along inner surface of arm in any specimen; strongly protuberant and completely black in ICN 42663 (Fig. 2) and IAvH 6673, only weakly protuberant and less conspicuously pigmented (but still swollen into tubercle-like projection) in ICN 43467. ICN 43465 is a subabult male (19.9 mm SVL) and ICN 42668 is a juvenile male (19.6 mm SVL); both lack any trace of dark, swollen tissue on ventral surface of upper arm.

Adult females 20.1–23.7 mm SVL (n = 5, $\bar{x}$ = 22.62 ± 0.65 mm). Mature oviducts unpigmented (white), strongly convoluted and swollen; mature ova dark brown, approximately 0.8 mm diameter. SVLs of two subadult females (IAvH6674, 22.2 mm SVL; ICN 42670, 22.8 mm SVL) and one large juvenile female (ICN 43464, 20.9 mm SVL) consistent with four adult females from same locality at 1600 m (22.7–23.7 mm SVL, $\bar{x}$ = 23.25 ± 0.21 mm), but

larger than single adult female from locality at 1200 m (ICN 43466, 20.1 mm SVL).

Skin of dorsal surfaces smooth, except shanks, which have very low, inconspicuous tubercles. Eyelids, posterior dorsum, thighs, and postrictal/preaxillary area all free of tubercles.

Head width between angle of jaws 32–38% of SVL, 1.0–1.2 times head length. Interorbital distance 29–33% of head width. Snout sloped, bluntly rounded in dorsal aspect, extended past edge of mouth, sharply rounded in lateral view. Canthus rostralis gently rounded. Loreal region flat or weakly concave, vertical, not sloping to lips. Eye length 39–42% of diagonal head length. Eye–naris distance 54–59% of snout length, 64–76 and 69–79% of eye length in males and females, respectively. Nares slightly protuberant, directed posterodorsad. Tympanum well-defined, relatively large, its greatest diameter 45–58% of eye length. Supratympanic bulge low and diffuse, strongest posteriorly but not forming a fold. Teeth present on maxillary arch.

Hand length 24–27% of SVL and 1.1–1.2 times forearm length. Discs weakly to moderately expanded. Preaxial surface of Finger III not expanded in males relative to females. Fringes absent from fingers (but with weak keeling distally). Finger I slightly longer than (usually) or subequal to Finger II when appressed. Finger II extended just past distal subarticular tubercle of Finger III; Finger IV to middle of that tubercle. Relative lengths of appressed fingers IV < II ≤ I < III. Subarticular tubercles 1–1–2–2. Supernumerary tubercles absent. All tubercles strongly protuberant in three specimens collected in pitfall traps (ICN 43464–66; fixed while floating): subarticular tubercles elliptical; thenar tubercle elliptical; palmar tubercle subcircular or weakly elliptical. Tubercles less protuberant in specimens fixed normally (laid out in fixing tray): thenar tubercle weak, diffuse, non-protuberant; palmar tubercle subcircular or weakly triangular. Metacarpal fold or ridge absent in all specimens.

Tibia length and foot length 41–47% and 40–43% of SVL, respectively. Relative lengths of appressed toes I < II < V < III < IV. Toe III extended to midlevel of antepenultimate phalanx of Toe IV; Toe V to middle of penultimate subarticular tubercle. Toe webbing completely absent. Toe fringes absent, but most specimens with very weak keels distally. Discs weakly to moderately expanded. Subarticular tubercles 1–1–2–3–2. Supernumerary tubercles absent. Tubercles strongly protuberant in three pitfall specimens (see above), less so in others. Inner metatarsal tubercle weakly elliptical in pitfall specimens, distorted in others. Outer metatarsal tubercle subcircular, slightly smaller than inner metatarsal tubercle. Outer metatarsal fold present in all specimens, expressed as very weak thickening of skin along outer edge of foot; thickening increases to form low tubercle in proximal one-fourth of distance between outer metatarsal tubercle and base of Toe V. Tarsal keel disconnected from inner metatarsal tubercle; arises abruptly but not tuberclelike; extends along about one-fifth tarsal length; directed obliquely along tarsus, strongly curved laterad in some specimens (e.g., ICN 42663–65, 42668, 43464), weakly curved in others (e.g., IAvH 6673–74, ICN 43467, 42666–67, 42670).

Color in preservative.—With the exception of the occurrence of the black, apparently glandular structure on the inner forearm of males, no sexual dimorphism occurs in color or pattern. Dorsal surfaces of both sexes are black or blackish brown. In some specimens (e.g., ICN 42665, 42670), iridophores are scattered over the dorsum, forming a mottled pattern of diffuse, irregularly shaped, gray blotches and lines where they are more concentrated. The blotches are more extensive in juveniles. In darker specimens (e.g., IAvH 6673, ICN 42664), the dorsum is free of iridophores. The pale dorsolateral stripe is absent.

All lateral surfaces (i.e., flanks, face, lips) are black with pale markings. A conspicuous whitish facial stripe or series of spots extends under the eye from the loreal region to just anterior to the arm. The oblique lateral stripe is composed of a series of elongate gray or whitish spots (ex-

cept ICN 43464 in which it forms an unbroken stripe) extending from the groin around the outer edge of the eyelid along the canthus rostralis and around the tip of the snout. A ventrolateral stripe is absent, but ventral flanks (lateral belly) have irregularly shaped, whitish spots. Absence of melanophores from the dorsal surface of the upper arm and the area around base of arm forms a strong, large flash mark.

The arm is dorsally pale brown with black or dark brown spots and blotches on the forearm, usually forming a band across the dorsal surface of the forearm. The ventral surface of the forearm and the posterior surface of the upper arm are black or dark brown. The anterior surface of the upper arm has a prominent, broad, black or dark brown longitudinal stripe from the inner surface of the elbow to the base of the arm. The ventral surface of the upper arm is yellowish cream, weakly stippled gray in dark specimens (e.g., ICN 42663). Palmar surfaces are brown, dark brown, or black. Contact surfaces of tubercles are gray.

A broad, black, longitudinal stripe occurs on the anterior surface of the thigh in all specimens. Above this, the skin is paler, forming a distinct yellowish longitudinal stripe, expanded into a pale blotch at the base of the thigh, with pale brown pigmentation distally. Dorsal and posterior surfaces of the thighs are usually black or very dark brown with pale spots and lines of variable shape and size, but two specimens have one (ICN 43466) or two (ICN 43464) well-defined black bars running obliquely across the light brown dorsum of the thigh. The posterior surfaces of the thighs of these two specimens exhibit an oblique, narrow, wavy, pale stripe; in other specimens, this stripe is broken into a series of diffuse pale spots. Medially, posterior surfaces of the thigh are blackish brown with pale flecks ventrally. Exposed surfaces of the shanks and feet are pale brown with irregular black spots, lines, blotches, commonly with one or more fairly well-defined transverse bands, or blackish with pale spots and blotches in darker specimens. Concealed surfaces of the shanks and feet are mostly yellowish with a few irregularly shaped blackish or brown spots. Outer surfaces of feet are completely black, brown, or pale brown with black bands and spots. Plantar surfaces are brown or blackish with light gray contact surfaces.

Ventral coloration is not sexually dimorphic, but the dark pigmentation varies extensively in ontogeny. Juveniles are ventrally pale with weak brown or gray stippling beginning on the throat and extending posteriad as ontogeny progresses. In adults of both sexes, the throat and chest are almost solid black, breaking up posteriorly to form irregular spots and blotches and terminating on the posterior fourth of the belly. The posterior belly, groin, and ventral surfaces of the thighs are free of dark pigmentation.

Color in life.—(Based on M. C. Ardila-Robayo's field notes and color transparencies; see Fig. 2.) The dorsum was dark yellowish or reddish brown with a green tinge. The facial stripe was pale brown with a golden or silver hue. Irregular cream botches extended along the anterior and preaxial surfaces of the arm and hand. Inguinal and axillary flash marks were bright yellowish orange. The flank was black. The oblique lateral stripe was white posteriorly, and yellowish or reddish brown or gray with a green tinge anteriorly from above the arms, along the eyelid, and around the snout. Legs were dark yellowish brown with irregularly shaped blackish brown spots, blotches, and transverse bands. Ventrally the throat, chest, and anterior half of belly were very dark brown with diffuse, pale brown, irregularly shaped small blotches and spots. The posterior belly, ventral surfaces of the thigh, and concealed surfaces of the shank and feet were yellowish orange with occasional brown flecks and spots. The posterior surface of the thigh was very dark brown with diffuse orange blotches and minute whitish flecks medially. Palmar and plantar surfaces were brown. The iris was black with minute golden yellow flecks; the pupil ring was golden.

Distribution and Natural History

Colostethus saltuarius occurs at moderate elevations (1200–1600 m) of the Cuch-

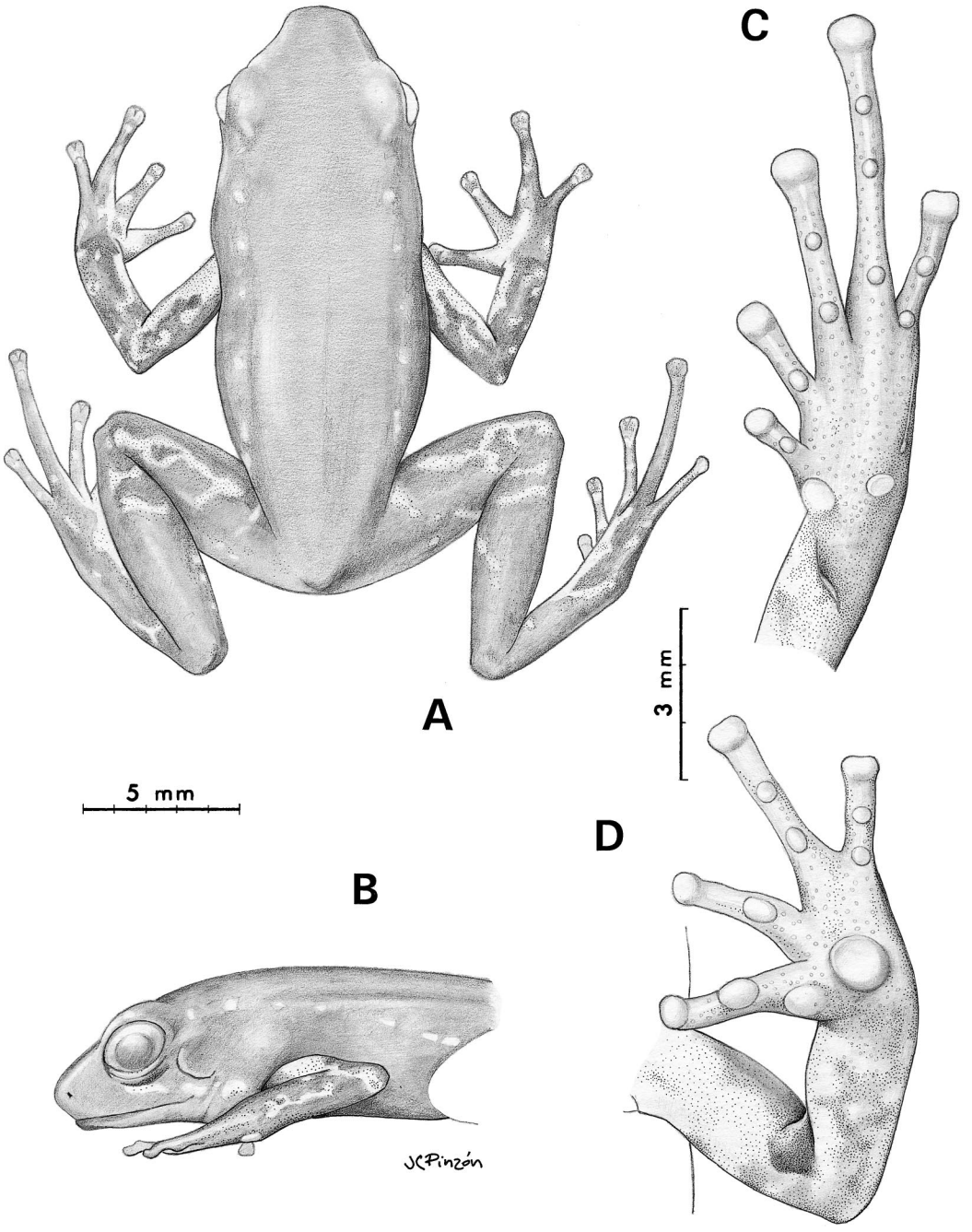

FIG. 2.—*Colostethus saltuarius.* (A,B) Dorsal and lateral views of adult male holotype (IAvH 6673; 21.4 mm SVL). (C,D) Foot and forelimb of adult male paratype (ICN 42663; 21.8 mm SVL). Note the black, swollen, apparently glandular tissue on the ventral and medial surfaces of the distal end of the upper arm.

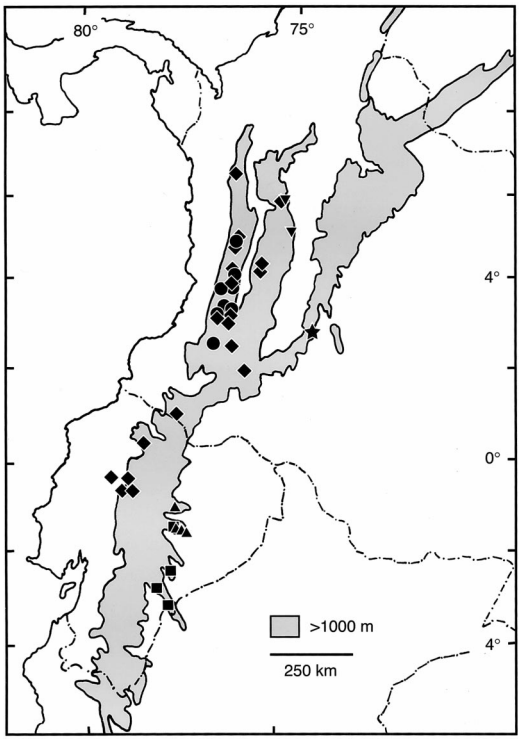

FIG. 3.—Distribution of species of the *Colostethus ramosi* group. Specimen and locality data are found in Appendix I and Silverstone (1971), Coloma (1995), and Grant and Castro (1998). Star = *C. saltuarius*; square = *C. exasperatus*; upright triangle = *C. cevallosi*; diamond = *C. lehmanni*; circle = *C. fascianiger*; inverted triangle = *C. ramosi.*

illa los Picachos, a spur of the eastern slopes of the Cordillera Oriental of Colombia. The two localities lie within the Parque Nacional Natural Cordillera de Los Picachos, a protected area of about 444,000 ha. Within the *C. ramosi* group, the only other named species known to occur on the Amazonian slopes are *C. cevallosi* and *C. exasperatus,* which are known only to occur well south of the equator (Fig. 3; Coloma, 1995).

Colostethus saltuarius is diurnal; most specimens were collected between 0800 and 1100 h and all were taken from the ground in primary forest, at least several meters from any body of water (thereby differing from the strictly riparian species of *Colostethus,* such as *C. palmatus*). Two specimens were captured in dung-beetle pitfall traps baited with excrement. *Colostethus saltuarius* was not distinguished from *C. picachos* in the field.

DISCUSSION

Colostethus saltuarius is part of the *Colostethus ramosi* group, which was proposed by Grant and Castro (1998) for *C. exasperatus* on the Amazonian slopes of the Ecuadorian Andes and *C. fascianiger, C. lehmanni,* and *C. ramosi* in the western Andes of Colombia and Ecuador and the Cordillera Central of Colombia (Fig. 3). The group is delimited by the occurrence of a patch of black, apparently glandular tissue on the ventral and medial surfaces of the distal extreme of the upper arm of adult males (absent in females and juveniles), just proximal to the elbow (called the "black arm band" by Grant and Castro). The expression of the character seems to be more exaggerated in sexually active males, and in extreme cases it extends distad along the inner surface of the forearm. Although Silverstone (1971) mentioned the structure several times in his description of *C. lehmanni,* he did not notice that it was sexually dimorphic or that it was present in *C. ramosi* (also named therein). Coloma (1995) also observed the structure in *C. exasperatus* but was unaware of its occurrence in other taxa. Unbeknownst to the above authors, the character state is also present in *C. cevallosi.* Rivero (1991) did not note the structure in his description of *C. cevallosi,* but it is clearly shown in his Fig. 6C (p. 18). Inasmuch as this character state is not known to occur in any other species of dendrobatid, its polarity seems clear, and, in the absence of a comprehensive phylogenetic study of Dendrobatidae, the structure is conjectured to be a unique synapomorphy.

As is the case for many species of *Colostethus,* the taxonomy of the *C. ramosi* group is far from resolved. Specimens have been taken of several apparently undescribed species that exhibit the diagnostic black gland at the distal end of the upper arm, but there is insufficient material to permit their description at this time. Similarly, the extensive distribution and differences in elevation between northern

and southern localities of *C. lehmanni* suggest that this may be a complex of species, but morphology has not yet yielded diagnostic characters, and other sources of data have yet to be examined (Coloma, 1995; Grant and Castro, 1998).

Grant and Castro (1998) questioned the validity of *Colostethus ramosi,* noting that the only known morphological character state that distinguishes it from *C. lehmanni* is the absence of a black longitudinal line on the anterior surface of the thigh (present in *C. lehmanni*). Thigh marking is highly variable in many species of *Colostethus,* and only two specimens were included in the type series of *C. ramosi.* Nevertheless, no specimen that lacks the longitudinal thigh stripe has been observed in a confirmed population of *C. lehmanni,* and two new specimens (IAvH 5513: adult male, 19.1 mm SVL; IAvH 5514: adult female, 20.2 mm SVL) that lack the thigh stripe from a second locality (Fig. 3) provide evidence that *C. ramosi* is indeed a distinct species. Both localities are on the eastern slopes of the Cordillera Central at modest elevations (1240–1340 m), lower than nearby *C. lehmanni* localities. Silverstone (1971) reported warmer and drier conditions at the type locality of *C. ramosi* than at that of *C. lehmanni,* which was an important factor in his decision to recognize them as different species (P. A. Silverstone-Sopkin, personal communication). Further evidence that *C. lehmanni* and *C. ramosi* are distinct species may be found in vocalizations. The call that Silverstone (1971:2) attributed to *C. ramosi* at the type locality "consisted of one note, repeated one minute or more, averaging 86 notes per minute, and 1.4 notes per second" and therefore contrasts with the call of roughly 15 "peeps" reported by Grant and Castro (1998) for *C. lehmanni.* However, Silverstone (1971) did not make a voucher recording or observe directly a calling male to confirm call identity, and field work at the type locality was inadequate to address the possibility that another species produced the call. It should also be noted that the temporal structure of the call of *C. lehmanni* appears to be highly variable, apparently as a function of population density (T. Grant, unpublished data). More data are required to resolve this problem satisfactorily, but, in the meantime, the single, diagnostic morphological feature justifies recognition of both taxa.

Resumen

Se describe una nueva especie de *Colostethus* de alturas moderadas de la Cuchilla los Picachos, en las estribaciones de la Cordillera Oriental de Colombia correspondiente al Departamento del Caquetá. Es una especie pequeña, diurna, que habita en sitios boscosos, en piso de bosque primario. Se caracteriza, en parte, por la ausencia de dimorfismo sexual cromático, dado que los adultos de ambos sexos presentan la garganta, el pecho, y la region anterior del abdomen de color café muy oscuro o negro. Los machos adultos presentan en las superficies ventrales y mediales, del extremo distal del brazo, una region de tejido negro, aparentemente glandular (="banda negra del brazo"), el cual se considera una sinapomorfía del grupo de *C. ramosi.* Las especies *C. exasperatus, C. fascianiger, C. lehmanni,* y *C. ramosi* se han considerado como parte de este grupo que unidas a *C. cevallosi* nos da un total de seis especies dentro del grupo *C. ramosi.* Para Colombia se incluyen nuevas localidades de *C. fascianiger, C. lehmanni* y *C. ramosi.*

Acknowledgments.—We are grateful to J. P. Caldwell, W. E. Duellman, J. Faivovich, and C. W. Myers for their insightful comments on the manuscript. T. Grant's funding was provided by a Graduate Student Fellowship at the American Museum of Natural History and a Center for Environmental Research and Conservation/Faculty Fellowship at Columbia University. T. Grant is grateful to F. Castro (Universidad del Valle), W. E. Duellman and L. Trueb (University of Kansas), J. D. Lynch (ICN), and Y. Muñoz-Saba (IAvH) for loans of specimens, work space, and the many other courtesies provided on numerous occasions, W. Bolívar-G., F. Castro, and J. D. Lynch for their invaluable help during field work, and W. L. Smith for help with graphics. C. W. Myers and P. A. Silverstone-Sopkin were generous with their knowledge of dendrobatid frogs and tropical biology in general. M. C. Ardila-Robayo thanks C. Samper (IAvH) for his invitation to participate in the project at Parque Nacional Natural Cordillera los Picachos in 1997, A. Repizo (IAvH) and his colleagues for logistical support, and F. Quevedo for his assistance and en-

thusiasm in the field. Local residents also provided invaluable field assistance. Drawings of *Colostethus saltuarius* were rendered by J. C. Pinzón.

Literature Cited

Ardila-Robayo, M. C., A. R. Acosta-Galvis, and L. A. Coloma. 2000, "1999". Una nueva especie de *Colostethus* Cope 1867 (Amphibia: Anura: Dendrobatidae) de la Cordillera Oriental colombiana. Revista de la Academia colombiana de Ciencias Exactas, Físicas y Naturales 23 (Suplemento especial): 239–244.

Coloma, L. A. 1995. Ecuadorian frogs of the genus *Colostethus* (Anura: Dendrobatidae). University of Kansas Natural History Museum Miscellaneous Publication 87:1–72.

Grant, T., and F. Castro. 1998. The cloud forest *Colostethus* (Anura, Dendrobatidae) of a region of the Cordillera Occidental of Colombia. Journal of Herpetology 32:378–392.

Rivero, J. A. 1991. New Ecuadorean [sic] *Colostethus* (Amphibia, Dendrobatidae) in the collection of the National Museum of Natural History, Smithsonian Institution. Caribbean Journal of Science 27:1–22.

Silverstone, P. A. 1971. Status of certain frogs of the genus *Colostethus,* with descriptions of new species. Los Angeles County Museum Contributions in Science 215:1–8.

Accepted: 2 July 2001
Associate Editor: Stephen Tilley

Appendix I

New Specimen Records

Colostethus fascianiger.—COLOMBIA: Cauca: Parque Nacional Natural Munchique, Tambito, 1550 m, ICN 35520–30; Municipio El Tambo, corregimiento 20 de Julio, Fundación Proselva, Hacienda El Tambito, 1470–1580 m, ICN 32803–17.

Colostethus lehmanni.—COLOMBIA: Antioquia: Represa de Santa Rita, 6 km (airline) SSW Alejandría, 1930 m (topotypes), AMNH 104354–56; Municipio Frontino, Corregimiento Nutibara (=La Blanquita), Km 16.5–17, 1900 m, ICN 16281–83. Huila: 3 km SW San Agustín, 1750 m, KU 170503. Nariño: Reserva Natural "La Planada", 7 km S Chucuñez, 1780 m, IAvH (= IND-AN) 1527, 1540–41, 1553–54, 1793–1800. Valle del Cauca: mts. above S side of Lago Calima, about 2 km airline SW Puente Tierra, 1580–1600 m, AMNH 104350–53.

Colostethus ramosi.—COLOMBIA: Caldas: Municipio Samaná, corregimiento Florencia, vereda San Lucas, 1340 m, IAvH (IND-AN) 5513–14.

Colostethus sauli.—COLOMBIA: Putumayo: 10 km S Mocoa, 700–800 m, AMNH 85029.