

A STRIKING NEW SPECIES OF BARBET (CAPITONINAE: *CAPITO*) FROM THE EASTERN ANDES OF PERU

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ABSTRACT.—In 1996, an expedition of personnel from the Louisiana State University Museum of Natural Science and the Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos made a trail from the east bank of the upper Río Cushabatay, departamento Ucayali, Peru, northeast to the top of a 1,538-m peak at 7°05'S, 75°39'W. The peak supports cloud forest from 1,200 m to the summit, and this "island" of habitat may be among the most isolated areas of cloud forest in South America. Among the depauperate cloud-forest avifauna we discovered a striking new species of *Capito* barbet, which apparently is the only member of the genus restricted to this habitat. Received 22 December 1999, accepted 17 March 2000.

BARBETS OF THE GENUS *Capito* are widely distributed in the lowlands of northern South America, reaching their greatest diversity in the Chocó rainforest of western Colombia and Ecuador. Although they are colorful birds of the tropical forest canopy, most species remain relatively poorly known, with two being described in the early 20th century (Cherrie 1916 and Chapman 1921). We are excited, therefore, to report the discovery of a previously undescribed species that exhibits striking colors and plumage pattern and apparently is the only member of the genus that is restricted to cloud forest.

In July 1996, a Louisiana State University Museum of Natural Science expedition led by O'Neill camped at 300 m on the east bank of the upper Río Cushabatay, approximately 77 km west-northwest of the town of Contamana, departamento Loreto, Peru. On 7 July, field assistants completed a trail to the top of an unnamed, isolated peak that reaches 1,538 m at its summit. Because of a lack of water, no permanent camp could be established on the peak, and most of the expedition members had access to the forest at the summit only during the day. It took several days before the members of the expedition began to become acquainted with the avifauna of what must be some of the most

isolated cloud forest in Peru, if not in all of South America.

On 15 July, Lane and Manuel Sánchez S. collected four individuals of a species of barbet that they immediately suspected was new to science. Its plumage, shape, and size clearly seemed to place the bird in the genus *Capito* (see cover illustration). Within the next two weeks, members of the party obtained nine more specimens. Collecting of barbets ceased on 26 July 1996, when members of the expedition concentrated more on obtaining information on natural history. On a given day, we encountered up to eight individuals from the trail through the cloud forest, which allowed us to document their voice and habits with photographs, tape recordings, and behavioral notes gathered during about 4 h of observation. We are pleased to name this colorful new barbet:

Capito wallacei sp. nov.
Scarlet-banded Barbet

Holotype.—Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos (MUSM) No. 21269, female, about 77 km WNW of Contamana (ca. 7°05'S, 75°39'W), departamento Loreto, Peru, elevation 1,450 m; collected 20 July 1996 by Orlando Riva P.; prepared by Leticia A. Alamía, original catalog number 1045.

Diagnosis.—A capitonine, assignable to the

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genus *Capito* by the combination of a stout bill, circular nostrils separated from each other by a broad mesorhinum, a tail less than two-thirds the length of the wing, outer rectrices more than three-fourths as long as the middle pair, outermost primary (P10) much less than half as long as P9 and relatively narrow, back black with some yellow and red coloration, and minimal sexual dimorphism in plumage pattern (Ridgway 1914). Separable from all known species in the genus by the combination of scarlet crown and nape (scarlet extending onto the mid-back), white superciliary, black sides of face, white throat separated from yellow breast and belly by a broad scarlet band, and pale yellow line that extends mid-dorsally from the red on the lower back to the uppertail coverts, where it becomes a white rump patch that extends to the uppertail coverts (see cover).

Description of holotype.—Forehead, crown, and nape brilliant scarlet red, nearest Spectrum Red (capitalized color names from Ridgway 1912), this color extending posteriorly onto the middle of the back and ending in a “vee.” Supercilium white, extending from just in front of the eye to the rear edge of the ear coverts, and broadening posteriorly. Lores, areas above and below eye, and ear coverts black with the ventral-most row of subocular feathers tipped white, giving the appearance of tiny white dots. Throat and upper breast white, bordered below by a broad (13.5 mm at its center) Scarlet-Red band. Lower breast and belly yellow, nearest Picric Yellow, fading into a yellowish-white color between Sea-foam Yellow and White on undertail coverts. Flanks washed with yellow-orange, nearest Light Cadmium, with a few feathers bearing scattered red areas and some dark brownish-black feather bases that show through the yellow-orange. Scapulars mostly black, outermost row of feathers near Picric Yellow, forming a vee-shaped pattern that joins at the posterior edge of the red vee that extends onto the back; at this point the yellow extends medially and posteriorly approximately 10 mm in a narrow line that abruptly changes to white and continues posteriorly down the otherwise black lower back and rump to the uppertail coverts. Uppertail coverts black, but with the inner web of the central covert feathers mostly white, forming a white rump patch. Wings black with P10 through P8 very dark brown (old and worn)

contrasting with blacker, newly molted inner primaries; outer edges of outer webs of secondaries dull olive-green with pale buffy-white spots along the shafts of the outer webs of the innermost secondaries. All remiges but P10 edged buffy-yellowish white on inner webs; rectrices plain black.

Irides blood red; maxilla light gray with distal half, including tomium, black; mandible light gray with distal third and tomium black; feet and tarsi greenish gray; soles orange-yellow.

Measurements of holotype.—Flattened wing chord 90.0 mm, tail 55.0 mm, culmen (nares to tip) 19.0 mm, culmen depth at nares 9.5 mm, tarsus 25.5 mm, ovary 9 × 5 mm, ova less than 1 × 1 mm, skull 75% ossified, no bursa, body mass 78 g.

Specimens examined.—Lane (1999) scored plumages of specimens of 36 of the 39 named taxa of Neotropical barbet genera (*Capito* and *Eubucco*) and assembled tape recordings of as many taxa as possible for vocal analyses. He examined approximately 500 specimens, at least 380 of which were in the genus *Capito* (see Lane 1999). Below, we detail the specimens of the new species examined in this study.

Thirteen specimens (holotype and 12 paratypes), all from the type locality (ranging over an elevational band from ca. 1,350 to 1,500 m) and prepared as conventional study skins unless otherwise noted in Table 1. Males: Louisiana State University Museum of Zoology (LSUMZ) 161645, 161648, 161649, and 161651; MUSM 17573 and 17574. Females: LSUMZ 161646 and 161650; MUSM 17570, 17571, 17572, and 21269 (holotype). Female (by plumage): LSUMZ 162073. The label information for these specimens is presented in Table 1.

Etymology.—We name this species in honor of Robert B. Wallace of Washington, D.C., in recognition of his intense interest in, and support of, ornithological exploration by the Louisiana State University Museum of Natural Science in Peru. His understanding of the need to study areas that are biologically unknown, before they are forever changed by development, is greatly appreciated. The English name draws attention to the most distinctive marking of this bird.

REMARKS

Variation within the type series.—In addition to the holotype, we prepared 10 study skins, a

TABLE 1. Information from specimen labels of the holotype and paratypes of *Capito wallacei*.

Museum no.	Elev. (m)	Preparation	Mass (g)	Skull ^a	Bursa ^b	Gonads ^c	Fat
Males							
LSUMZ 161645	1,400	Skin	65	5	—	3 × 3	Light
LSUMZ 161648	1,450	Skeleton, skin ^d	65	—	10 × 4	2 × 2	—
LSUMZ 161649	1,450	Skin	75	10	—	4 × 2	—
LSUMZ 161651	1,400	Skin	69	10	9 × 6	3 × 2.5	Light
MUSM 17573	1,450	Skin	78	100	—	2 × 2	Moderate
MUSM 17574	1,450	Skin	63	—	—	2 × 2	Light
Females							
LSUMZ 161646	1,350	Skin	71	10	—	9 × 5	Light
LSUMZ 161650	1,350	Skin	74	—	—	8 × 4	—
LSUMZ 162073	1,350	Alcoholic	68	—	—	—	—
MUSM 17570	1,400	Skin, skeleton ^e	64	—	8 × 4	6 × 4	—
MUSM 17571	1,400	Skin	67	—	—	7 × 5	—
MUSM 17572	1,400	Skin	66	—	—	9 × 6	—
MUSM 21269 ^f	1,450	Skin	78	75	—	9 × 5	—

^a Skull ossification (%).

^b Depth of bursa (mm).

^c Dimensions (mm) of left testis for males, ovary for females.

^d Complete skeleton, partial skin.

^e Complete skin, partial skeleton.

^f Holotype.

complete skeleton with skin, and preserved a specimen in formalin for dissection. Aside from being slightly smaller (Table 2), males differ from females only in lacking the golden-yellow edges to the feathers of the scapulars, by having no white dots in the black plumage below the eyes, and by lacking pale spots on the inner portion of the outer webs of the innermost secondaries (see cover). The size of these pale spots varies among females. In addition, the flanks of males tend to be washed more strongly with orange than are those of females. The skulls of three individuals that retained the

bursa of Fabricius were not fully ossified (see McNeil and Burton [1972] and Harrison [1964] for discussion of the use of skull pneumatization and bursa of Fabricius in aging birds). As with other members of the genus, it appears that *Capito wallacei* molts quickly into adult-like plumage; thus, young of the previous breeding season may be sexually immature, but look like adults (D. F. Lane pers. obs.).

Distribution.—The species is presently known only from an unnamed peak labeled on topographic maps as "Peak 1538" (ca. 7°05'S 75°39'W) and so referred to by us. This peak is

TABLE 2. Selected measurements (mm) of *Capito wallacei*.

Museum no.	Culmen	Wing	Tail	Tarsus	Bill depth
Males					
LSUMZ 161645	16.5	91	56.0	25.0	9.0
LSUMZ 161649	16.5	93	53.0	25.5	9.0
LSUMZ 161651	17.0	95	54.0	25.5	9.0
MUSM 17573	16.0	86	53.5	24.0	10.0
MUSM 17574	18.0	88	51.0	23.0	9.5
$\bar{x} \pm SD$	16.8 ± 0.76	90.6 ± 3.65	53.5 ± 1.80	24.6 ± 1.08	9.3 ± 0.45
Females					
LSUMZ 161646	18.0	91	51.0	26.0	9.5
LSUMZ 161650	17.5	93	54.0	25.0	9.0
MUSM 17570	17.0	92	54.5	23.5	9.0
MUSM 17571	17.0	91	55.0	24.5	9.5
MUSM 17572	16.0	90	—	25.0	9.0
MUSM 21269	19.0	90	55.0	25.5	9.5
$\bar{x} \pm SD$	17.4 ± 1.02	91.2 ± 1.17	53.9 ± 1.67	24.9 ± 0.86	9.3 ± 0.27

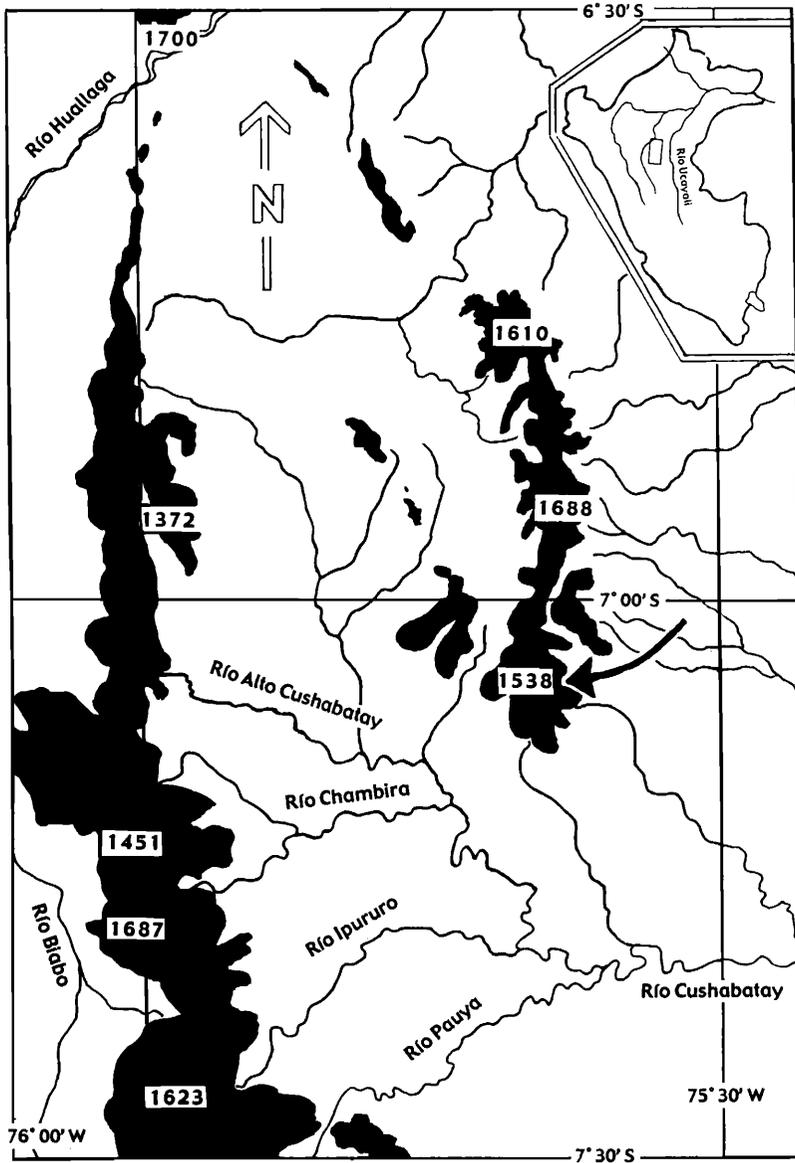


FIG. 1. Headwaters of the Río Cushabatay. Montane areas above 1,000 m are shown in black, with elevations of major peaks noted in meters. Solid arrow points to peak where *Capito wallacei* was discovered. Cloud forest in this area seems to develop only above 1,200 m.

approximately 15 km NNE of the upper Río Cushabatay, between the east bank of that river and the west bank of the Río Ucayali, of which the Cushabatay is a tributary, approximately 77 km WNW of Contamana, departamento Loreto, Peru (see Fig. 1). A long (>50 km), narrow ridge at more than 1,000 m elevation that extends to the north of Peak 1538 has two additional high peaks, one of 1,688 m and another

of 1,610 m. In the main ridge of the Cordillera Azul, approximately 30 km to the west, a larger area above 1,000 m contains several peaks that range from 1,372 to 1,687 m. We predict that the new barbet will be found in the ridge system to the north of Peak 1538 and that it probably occurs to the west as well. Except for Peak 1538, the system of low mountains stretching north to the Río Huallaga and some of it to the south

remains unexplored. Any areas above 1,250 m are likely to provide cloud-forest habitat for *Capito wallacei*. Presently, threats to *C. wallacei* are few because little human habitation occurs in the Cushabatay watershed, and none above 300 m. Only a small amount of hunting is done by the infrequent visitors, and a recent ban on harvesting of mahogany (*Swietenia* sp.) will probably result in even fewer visitors. However, deforestation is extensive and increasing on the west slope of the Cordillera Azul, especially in the drainage of the Río Biabo, which flows into the valley of the Río Huallaga.

Habitat.—We found *Capito wallacei* only on and near the summit of Peak 1538 on a relatively flat plateau cloaked in cloud forest. During our dry-season visit, the summit plateau often was covered in clouds, even when adjacent areas were clear. Epiphytes, especially bryophytes, bromeliads, and orchids, covered most of the trunks and large branches of the short trees (generally 10 to 20 m tall) in the forest. The predominant trees near the summit were melastomes (Melastomaceae) and clusias (*Clusia* sp.). The forest floor had a deep (up to 1 m), spongy cover of mosses intermixed with leaf litter and soil. The wet, epiphyte-covered montane forest of the summit changed abruptly to taller and drier subtropical forest below 1,250 m. Epiphyte cover in the forest below 1,250 m was greatly reduced compared with the wetter, higher-elevation forest, and the soil surface was much firmer, with little or no moss. We found *C. wallacei* on all parts of the plateau that we visited but never saw it below the transition to drier forest at 1,250 m. Several species characteristic of the higher montane forest (e.g. Versicolored Barbet [*Eubucco versicolor*], Blue-winged Mountain-Tanager [*Anisognathus somptuosus*], White-winged Tanager [*Piranga leucoptera*], and Hepatic Tanager [*P. flava*]) were seen repeatedly below the transition zone. Perhaps the presence of a congener, the Gilded Barbet (*C. [niger] auratus*), just below the transition zone restricts *C. wallacei* to cloud forest above 1,250 m.

Peak 1538 occurs at the southern end of a north-south spur off the main axis of the Cordillera Azul, which trends southwest to northeast (Fig. 1). Although similar wet montane forests undoubtedly occur on adjacent peaks to the west and north in the Cordillera Azul, we were able to visit only this one area. Assuming

that 1,250 m is the lower elevational limit of the distribution of *C. wallacei*, Peak 1538 provides a small island of habitat isolated by 30 km from another larger island of habitat farther north on the same spur. These two habitat islands are about 35 km east of the main axis of the Cordillera Azul, which has an extensive area (ca. 1,200 km²) of terrain above 1,250 m and peaks to 1,700 m or more in elevation. Cloud cover on the main axis of the Cordillera often matched that on Peak 1538, suggesting similar climates and forest types. *Capito wallacei* was common in the wet forests on Peak 1538.

Behavior.—In general, the barbets moved through the tree canopy unobtrusively and were rather quiet or gave only soft calls. They foraged with the characteristic sluggish movements of other species of *Capito*, at least when in fruiting trees, and seldom changed perches. Despite their sluggishness, they were rather easy to find because of the distinctive whirring noise produced by the wings during flight (louder than other *Capito*; D. F. Lane pers. obs.). They stayed near the crowns of the trees in loose groups even when traveling with other species. Attesting to their predilection for the tree canopy was our failure to capture any in mist nets, even though we intensively sampled birds in the understory of these forests (ca. 4,800 net h).

On 5 August 1996 (nearly two weeks after we ceased collecting *C. wallacei*), from approximately 1400 to 1500 EST, Kratter and Lane watched a group of six birds that stayed in the vicinity of a non-melastome fruiting tree that contained reddish berries that were 1 cm in diameter. Often, one bird of this group stayed on the same perch for more than 5 min at a time. The birds foraged quietly in the shaded interior of the tree crowns, about 15 m above the ground and 5 m below the top of the canopy, although one bird sat motionless in the sun, with its body plumage fluffed out, for more than 5 min. Foraging birds used small (<1 cm in diameter) horizontal perches in fairly densely leafed portions of the tree crown. Foraging maneuvers ($n = 10$) consisted of "gleans" or "reach outs" (see Remsen and Robinson 1990) for fruits. The birds generally kept a diagonal posture on their perches, with the tail held at about 30° below the horizontal. One pair flew into the area together and perched within 5 cm of one another on a small horizontal stem. They

faced each other and tapped their bills together, perhaps allofeeding. Kratter then watched a group of three disappear into the dense leaves at the base of a large bromeliad, where they may have been drinking water. Lane later observed one bird in the group drinking from a bromeliad.

During another foraging observation, Kratter noted a bird about 10 m up (ca. 5 m below the canopy top) "hang down" from a horizontal perch and glean a fruit, probably a mistletoe berry. This bird kept its tail horizontal as it reached its head below the branch vertically. Although some barbets (especially *Eubucco* spp., but also *Capito*) regularly forage for insects in clusters of dead leaves trapped above ground (Remsen and Parker 1984, Rosenberg 1997, A.W. Kratter and D. F. Lane pers. obs.), we did not see *C. wallacei* foraging in this manner during our relatively brief observations.

We found *C. wallacei* in monospecific groups in 50% of our observations (4 of 8). Group size ranged from two to seven whether barbets traveled in single-species or in mixed-species flocks. All of the barbets in one mixed-species flock appeared to be foraging for insects in the outer crowns of trees in the canopy, and the barbets moved more actively in these mixed-species flocks than when they foraged in fruiting trees. Other species in mixed flocks included Chestnut-tipped Toucanet (*Aulacorhynchus derbianus*), Versicolored Barbet, Mottle-cheeked Tyrannulet (*Phylloscartes ventralis*), Slaty-capped Flycatcher (*Leptopogon superciliaris*), Masked Tityra (*Tityra semifasciata*), Three-striped Warbler (*Basileuterus tristriatus*), Slate-throated Redstart (*Myioborus miniatus*), Blue-naped Chlorophonia (*Chlorophonia cyanea*), Bronze-green Euphonia (*Euphonia mesochrysa*), Orange-bellied Euphonia (*E. xanthogaster*), White-winged Tanager, Hepatic Tanager, and Blue-winged Mountain-Tanager.

We did not observe breeding behavior, but three individuals retained the bursas of Fabricius, suggesting that they had fledged within the past six months. Thus, it is likely that the groups we observed were composed of one or more families.

Voice.—We obtained three sound recordings of *Capito wallacei*, all of which are archived at Cornell Laboratory of Ornithology's Library of Natural Sounds. *Capito wallacei* was observed giving two distinct vocalizations: a song (Fig.

2A) and a tityra-like grunting call (Fig. 2C). The latter was the most frequent vocalization given by the barbets and was frequently given by individuals in mixed-species foraging flocks, between members of presumed pairs, and among members of the evening congregation observed by Kratter and Lane. Grunt calls varied in harshness and duration depending on the circumstances but were similar to those given by other members of *Capito*. In addition, grunt calls were reminiscent of certain vocalizations given by *Aulacorhynchus derbianus* and *Eubucco versicolor* at the same site and in the same elevational range occupied by *C. wallacei*.

The long (ca. 50 to 120 notes), even-frequency purring song was given infrequently and apparently only by one member of a presumed pair (Fig. 2A). A detailed look at individual notes of the song shows what appears to be a pattern of a more heavily stressed note followed by a more lightly stressed note followed by a heavily stressed note, etc. (Fig. 2B). Owing to the small sample size of individuals and number of songs recorded, it is unclear whether this pattern is real. To the human ear, however, the song of *C. wallacei* strongly resembles the distant drumming of a medium-sized woodpecker and is quite unlike the slower, hooted songs of most other *Capito*. Songs of Orange-fronted (*C. squamatus*) and Spot-crowned (*C. maculicoronatus*) barbets are nearly identical to that of *C. wallacei* (Figs. 2D, E), differing in having slightly higher frequencies and fewer numbers of notes ($n = 12$ for *C. squamatus*, $n = 2$ for *C. maculicoronatus*, $n = 13$ for *C. wallacei*) and lacking the couplet pattern of notes present in *C. wallacei*. The voice of the Brown-breasted Barbet (*C. brunneipectus*) shows some similarities to that of *C. wallacei* as well (Fig. 2G) but accelerates from hooted notes into a purr that drops in pitch at the same time. Nearly all other members of the genus *Capito*, such as the closely related White-mantled Barbet (*C. hypoleucus*; Fig. 2F), have hooted songs with fewer, more easily defined notes. Purred songs are also present in two species in the sister genus *Eubucco* (Lane 1999).

On 4 August 1996, Kratter watched a single bird in a monospecific group of five or six barbets giving the very soft purring song. The bird was perched more horizontally than usual, with its tail parallel to the ground and its head thrust forward and pointed downward. Its

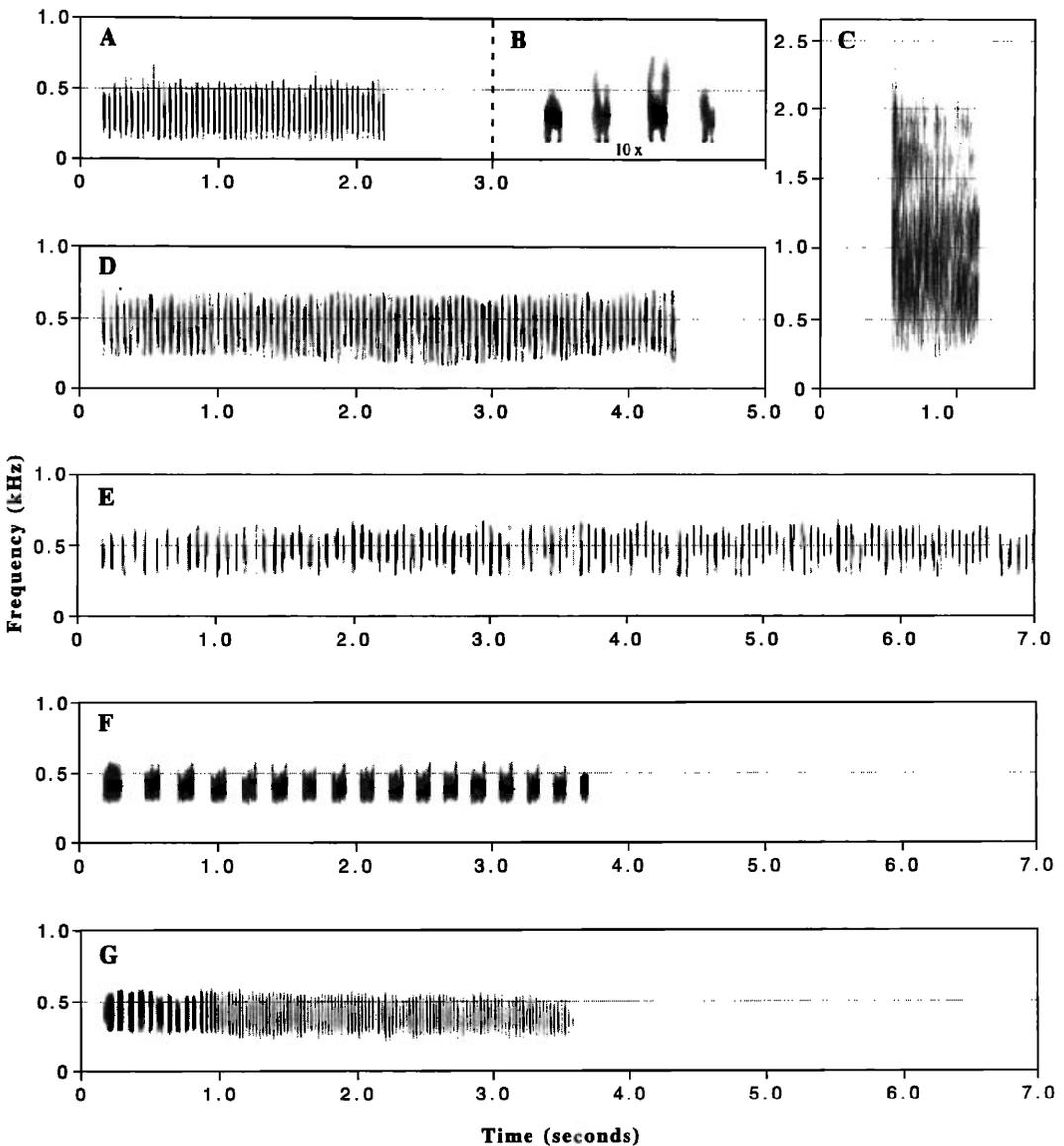


FIG. 2. Sonograms of *Capito wallacei* and four other members of the genus *Capito*. Names of recordists are in parentheses. (A) "Purring" song of *C. wallacei* (D. F. Lane); (B) section of song in A enlarged 10 \times to show the apparent couplet structure of notes within song; (C) tityra-like "grunt" call of *C. wallacei* (D. F. Lane); (D) "purring" song of *C. squamatus* (P. Coopmans); (E) "purring" song of *C. maculicoronatus* (L. Macaulay); (F) "hooting" song of *C. hypoleucus* (B. W. Whitney); and (G) "hoot-to-purr" song of *C. brunneipectus* (M. Cohn-Haft).

back feathers were fluffed out, and its tail quivered laterally as it sang.

Phylogenetic relationships.—Based on a cladistic analysis of plumage and vocalizations in the Capitoninae, *C. wallacei* belongs to a group with largely black-and-white plumage: *C. squamatus*, *C. maculicoronatus*, and *C. hypoleucus* (Lane

1999). Each of these species has a relatively small geographic range, and with the exception of *C. wallacei*, they are found on the western (Chocó) or northern (Nechí) flanks of the Andes. The discovery of *C. wallacei* suggests that the ancestor of this clade was widespread as a lower-elevation and/or submontane compo-

ment of the northern Andean avifauna (at least as far south as northern Peru) that was fragmented into sibling populations that became separate species, a scenario previously suggested by Chapman (1928).

Although all other members of the clade that contains *C. wallacei* appear to be quite distinct from it in lacking the red breast band and the white superciliary, and in the extent of streaking on the dorsum, they share several characters (Lane 1999). All have some suggestion of a breast band—yellow in *C. maculicoronatus*, brownish in *C. squamatus* and *C. hypoleucus*—a character lacking in the rest of the genus with the exception of *C. brunneipectus*. All clade members have a yellowish wash on the flanks, which is concentrated into a localized patch of yellow-orange or red in *C. maculicoronatus*. Finally, all show sexual dichromatism, but the degree varies among members of the clade. *Capito maculicoronatus* and *C. squamatus* share white throats in males and black hoods in females, whereas this difference is reduced to the female's acquisition of a black malar spot in *C. hypoleucus*. By comparison, sexual dichromatism in *C. wallacei* is more similar to that of members of the Black-spotted Barbet (*C. niger*) clade (sensu Lane 1999) in that it is limited to the female's acquisition of pale streaks on the scapulars, pale spots on the innermost secondaries, and pale-freckled lower auricular patches. *Capito brunneipectus*, a member of the *C. niger* clade, shares these sexually dimorphic characters with *C. wallacei*. However, these characters are only part of a larger suite of plumage characters exhibited by females of the *C. niger* clade, such as heavy spotting on the underparts, extensive pale markings on the wings, and extensive pale streaking on the head and back.

The song of *C. wallacei* is a hollow purr that is nearly identical to those of *C. maculicoronatus* and *C. squamatus* (Fig. 2). The song of *C. hypoleucus* is a slower series of hooted notes and is quite distinct from other members of the clade (Fig. 2) but more similar to other members of the genus *Capito*. Because *C. hypoleucus* is locally sympatric with *C. maculicoronatus*, it is conceivable that their different songs evolved to maintain reproductive isolation (Lane 1999). Sympatry, but with spatial separation by elevation, exists between *C. wallacei* and *C. [niger] auratus*. Interestingly, these two species also differ strongly in their voices, the latter having

a hooting song and the former a purring song. Whether this is coincidental, or is a case of "vocal niche partitioning" that reinforces reproductive isolation, is not clear. Owing to its distinctiveness in plumage pattern and sexual dichromatism compared with other members of its clade (much less the rest of the genus), we believe it is safe to say that *Capito wallacei* is a valid species by any species concept.

With the description of this barbet, we look forward to returning to the northern portion of the Cordillera Azul to see what other hidden treasures it holds and to look in other montane islands for additional populations of *Capito wallacei*. The members of the 1996 expedition encountered several other "mystery" birds that were not collected and likely are undescribed taxa. The headwater regions of the Río Cushabatay, Río Pisqui, and Río Biabo encompass one of Peru's largest pristine and biologically unknown areas. The region has been proposed as a protected area, and no matter what level of protection it receives, the cloud forests, including the entire known range of the new barbet, will receive legal protection as watershed forests.

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LITERATURE CITED

- CHAPMAN, F. M. 1921. Descriptions of apparently new birds from Bolivia, Brazil, and Venezuela. *American Museum Novitates* 2:1-8.
- CHAPMAN, F. M. 1928. Mutation in *Capito auratus*. *American Museum Novitates* 335:1-21.
- CHERRIE, G. 1916. New birds from the Collins-Day expedition to South America. *Bulletin of the American Museum of Natural History* 35:394-395.
- HARRISON, J. G. 1964. Pneumatization of bone. Pages 649-650 in *A new dictionary of birds* (A. L. Thomson, Ed.). McGraw-Hill, New York.
- LANE, D. F. 1999. A phylogenetic analysis of the American barbets using plumage and vocal characters (Aves; family Ramphastidae; subfamily *Capitoninae*). M.S. thesis, Louisiana State University, Baton Rouge.
- MCNEIL, R., AND J. BURTON. 1972. Cranial pneumatization patterns and bursa of Fabricius in North American shorebirds. *Wilson Bulletin* 84:329-339.
- REMSEN, J. V., JR., AND T. A. PARKER III. 1984. Arboreal dead-leaf-searching birds of the Neotropics. *Condor* 86:36-41.
- REMSEN, J. V., JR., AND S. K. ROBINSON. 1990. A classification scheme for foraging behavior of birds in terrestrial habitats. Pages 144-160 in *Avian foraging: Theory, methodology, and applications* (M. L. Morrison, C. J. Ralph, J. Verner, and J. R. Jehl, Eds.). *Studies in Avian Biology* No. 13.
- RIDGWAY, R. 1912. *Color standards and color nomenclature*. Published by the author, Washington, D.C.
- RIDGWAY, R. 1914. The birds of North and Middle America. Part VI. *Bulletin of the United States National Museum* No. 50.
- ROSENBERG, K. V. 1997. Ecology of dead-leaf foraging specialists and their contribution to Amazonian bird diversity. Pages 673-699 in *Studies in Neotropical ornithology honoring Ted Parker* (J. V. Remsen, Jr., Ed.). *Ornithological Monographs* No. 48.

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