REDISCOVERY OF *AULACORHYNCHUS PRASINUS DIMIDIATUS* (RIDGWAY)

JOHN P. O'NEILL AND ALFRED L. GARDNER

WHILE gathering material for an ecological survey of the birds and mammals in the vicinity of the Cashinahua Indian village of Balta on the Río Curanja in the Department of Loreto in eastern Peru (10° 08′ S, 71° 13′ W, elevation ca. 300 m) we obtained three specimens of *Aulacorhynchus prasinus*. These three specimens include an adult male and an adult female with an enlarged ovary (largest ovum ca. 9 mm) collected in July, and a juvenile male collected in January. Later, in making comparisons at the American Museum of Natural History in New York, O'Neill found these three specimens to be smaller than most of the examples of *A. p. atrogularis* in that collection. However, among the material there he located two specimens that closely matched the Balta birds in color, pattern, and size, and interestingly enough, had the notation "tropical zone" on their labels.

Subsequent study showed these five birds to match closely Ridgway's (1886) description of his *Aulacorhamphus dimidiatus,* a form not recorded since it was made known to science and for which no exact locality exists. Ridgway characterized his new form as being small with a small bill and with a culmenal stripe wider in relation to the culmen than it was in the other material he had for comparison. We studied the holotype and paratype in the National Museum of Natural History and found that their bills are of the same general size, bulk, and pattern as those of the Balta birds. Unfortunately neither the paratype nor the holotype have wings and therefore it is not possible to obtain a wing measurement, the character for these nonmigratory tropical birds that we consider, in the absence of weights, to be a more accurate indicator of size than the highly variable length of the culmen.

Of the 15 subspecies of *Aulacorhynchus prasinus* listed by Peters (1948), only *dimidiatus* and *atrogularis* have black throats. Traylor (1958), after comparing the holotype and paratype of *dimidiatus* with specimens of *atrogularis,* recommended placing *dimidiatus* in the synonomy of the latter. To determine if *A. p. dimidiatus* should be recognized as a valid race, we borrowed for comparison and measurement most of the black-throated toucanets available in the museums of the United States. The great variation among these toucanets in size and pattern of the bill, noted by Traylor (1958), was immediately apparent. Closer inspection, however, reveals certain general tendencies, chief of which is that birds with the longer wing chord are, as might be expected, found at higher elevations and that, conversely, the smaller birds are us-

TABLE 1

LEAST SQUARES ANALYSIS OF VARIANCE ON SELECTED VARIABLES OF THE TWO BLACK-THROATED SUBSPECIES OF *AULACORHYNCHUS PRASINUS*

	atrogularis	*dimidiatus*				
	N	N	df	Partial ss	F	Prob. F
Wing	38	8	1	35630.13	23.79	0.0001[1]
Tail	38	9	1	30783.24	9.81	0.0039[1]
Tarsus	28	6	1	316.08	1.35	0.2553
Culmen	40	9	1	39518.77	20.99	0.0002[1]

[1] $P < 0.01$.

ually found at lower elevations. This was ascertained by plotting the wing chord length in millimeters against the elevation in hundreds of meters. Unfortunately only 29 of the specimens examined had elevational data on their labels. But one must always bear in mind that the collecting of a bird at a given elevation does not necessarily mean that it breeds at that elevation. That members of the genus *Aulacorhynchus* wander widely is clearly exemplified by our having collected *A. prasinus*, *A. derbianus*, and *A. coeruleicinctus* at Huanhuachayo (Departamento de Ayacucho, 12° 44′ S, 73° 47′ W, elevation ca. 1600 m) in the valley of the Río Apurímac in southern Peru, despite the fact that the three species are rarely sympatric during the breeding season.

To test further the hypothesis that a direct correlation exists between elevation and chord winglength we submitted the data from the 29 specimens for which elevational data are available to a computerized regression analysis. We found 15.77% of the variation in winglength in black-throated toucanets of both subspecies combined is accounted for by the linear effect of elevation and that this is significant at the 0.05 level. (b = : 0.049 mm increase in winglength per meter of elevation.)

At the same time we submitted available data to a computerized least squares analysis of variance test to see if the differences between the two subspecies in four variables—wing, tail, tarsus, culmen—were statistically significant. Of the four variables only the difference in the length of the tarsus was not statistically significant, the other three being significant at the 0.01 level (see Table 1).

Five of the specimens among those examined have not only been taken at a low elevation but also form a group conspicuously smaller in size than the remainder of the material. These five specimens, along with four others with similar measurements but for which no elevational data were available, were then more closely scrutinized to see what, if any, other characters they shared that differed from those of the larger specimens examined. We found that they lack almost entirely the blue border to the throat, which is usually obvious in the larger birds, and

TABLE 2
MEASUREMENTS OF SELECTED CHARACTERS OF THE TWO BLACK-THROATED SUBSPECIES OF *AULACORHYNCHUS PRASINUS*

	atrogularis		*dimidiatus*	
	N	Mean and range	N	Mean and range
Wing	38	123.6 (115.0–129.5)	8	111.4 (108.1–118.1)
Tail	38	120.1 (102.1–125.9)	10[1]	106.2 (95.2–115.8)
Culmen	40	71.4 (61.1–79.9)	10[1]	57.7 (54.0–69.9)

[1] Includes measurements of holotype from Traylor (1958).

that the narrow supraorbital streak tends to be grayish or whitish, whereas in the larger birds it is pale bluish or greenish. As Traylor (1958) pointed out the size of the black culmenal stripe, stated by Ridgway to be a key character of *dimidiatus,* is variable and seems to be of no use as a taxonomic character.

We believe that, on the basis of the above characters, *dimidiatus* should be recognized as a distinct subspecies. It can be characterized by its small size (see Table 2), by breeding in the tropical zone, shown by the collecting at Balta of an adult female with an enlarged ovary and a male in juvenile plumage, and by having the color differences noted above. Although few specimens are available from the area between the Andean foothills and Balta, *dimidiatus* and *atrogularis* appear to make contact and form a zone of intergradation, especially in the southern Peruvian departments of Ayacucho and Cuzco where the greatest variation in size is present.

There are two plausible explanations for this size variation in the black-throated toucanets of southeastern Peru. One is that the large birds represent wandering, nonbreeding individuals from higher elevations, and the smaller birds represent the breeding form. An alternative explanation, which we believe more likely, is that *dimidiatus* was formed as an isolate from a single population localized when forest refugia were created in southeastern Peru by Pleistocene climatic changes as outlined by Haffer (1969). The present, variable population then is the result of the secondary contact of the two forms that were apparently isolated for only enough time to allow differentiation to the subspecific level.

The type locality of *dimidiatus* was originally thought to be somewhere in the interior of Venezuela but was later emended to Peru on the basis of the other birds attached to the Indian belt from which the holotype and paratype were taken (Chapman 1914). The other birds represented included such species as *Bolborhynchus lineola* and *Pyroderus scutatus,* both of which are usually found at elevations above 1000 m. Being somewhat familiar with the artifacts of the tropical forest Indians

of Peru, we tried to locate the belt from which the specimens were taken to see if the materials contained in it or if the method of construction would provide clues that would permit the type locality of the toucanet to be more clearly defined. Clifford Evans, Chairman of the Department of Anthropology, National Museum of Natural History, was kind enough to spend a considerable amount of time trying to locate the belt but was unable to do so. He informed us (pers. comm.) that the belt apparently no longer exists. We can only say that on the basis of the species of birds reported to have been attached to the belt and their known ranges, the type locality must be along the eastern foothills of the Andes of central southern Peru.

Although Meyer de Schauensee (1966) does not include Bolivia in the range of *Aulacorhynchus prasinus,* we found four specimens that were taken there. One of these is in the Field Museum in Chicago (FMNH 216095, Department of Sta. Cruz, Province of Ichilo, Río Colorado) and three are in the Louisiana State University Museum of Zoology (LSUMZ 37511, Río Colorado; 37512, Department of Sta. Cruz, Province of Cercado, Espejos; 35942, Department of Cochabamba, Province of Chapare, Alto Palmar). All four of the specimens are referable to the large *A. p. atrogularis.*

Specimens Examined

A. p. atrogularis. Peru.—AMNH: 6154 ("Peru"); 487099–487103 (Chanchamayo); 169639–169640 (Tulumayo); uncatalogued (Cordillera Vilcabamba) (Sta. Rosa). ANSP: 20461 (Colombia [= Peru]); 20467 (Western Peru); 20468–20469 (South America [= Peru]); 74327 (Perene River, Chanchamayo); 92589–92591 (Enenas, Pichis trail). BMNH: 81.5.1.3455 (w. Peru). FMNH: 50415–50416 (Chanchamayo); 187651 (Fundo Sinchona); 189905 (Chanchamayo); 208228 (Huajyubambe); 222903 (Hacienda Villa Carmen); 251722 (Boca de Río Inambari); 251723 (Boca de Río Piedras); 278315 (Yurinaki Alto); 28258 (Conchapen Mt.). LSUMZ: 62227 (Divisoria); 68838–68839 (Huanhuachayo); 68840 (Sta. Rosa). Bolivia.—FMNH: 216095 (Río Colorado). LSUMZ: 35942 (Alto Palmar); 37511 (Río Colorado); 37512 (Espejos).

A. p. dimidiatus. Peru.—AMNH: 146034 (La Pampa); 146035 (Astillero). FMNH: 208227 (Marcapata); 251724 (Collpa); 251725 (Hacienda Villa Carmen). LSUMZ: 35170, 51786, 64501 (Balta). USNM: 106052, 106053 (no locality, holotype and paratype, respectively).

AMNH (American Museum of Natural History), ANSP (Academy of Natural Sciences of Philadelphia), BMNH (British Museum, Natural History), FMNH (Field Museum of Natural History), LSUMZ (Louisiana State University Museum of Zoology), USNM (National Museum of Natural History).

Acknowledgments

We are grateful to the following who allowed us to use the material in their care: Dean Amadon of the American Museum of Natural History; E. R. Blake of the Field Museum of Natural History; James Bond of the Academy of Natural

Sciences of Philadelphia. R. C. Banks and R. L. Zusi of the National Museum of Natural History provided information on the type and paratype of *A. p. dimidiatus* and arranged for a loan of the latter; G. H. Lowery, Jr. of the Louisiana State University Museum of Zoology allowed us to use the material in his care and kindly measured the specimen of *A. p. atrogularis* in the British Museum (Natural History). K. L. Koonce of the Louisiana State University Department of Experimental Statistics handled the computerized statistical analyses. The expeditions on which we collected information and material for this project were supported by the Louisiana State University Museum of Zoology. Financial assistance for much of the fieldwork in Peru was provided by J. S. McIlhenny of Baton Rouge, Louisiana, and the Bradley Fisk Fund. Comparative work in the American Museum of Natural History in 1969 was partially financed through a grant to the senior author from the Frank M. Chapman Memorial Fund of that institution. G. H. Lowery, Jr. and Robert J. Newman of the Louisiana State University Museum of Zoology and E. R. Blake and M. A. Traylor of the Field Museum of Natural History each critically read the manuscript.

LITERATURE CITED

CHAPMAN, F. M. 1914. Diagnoses of apparently new Colombian birds. Bull. Amer. Mus. Nat. Hist. 33: 603–637.

HAFFER, J. H. 1969. Speciation in Amazonian forest birds. Science 165: 131–137.

MEYER DE SCHAUENSEE, R. 1966. The species of birds of South America and their distribution. Wynnewood, Pennsylvania, Livingston Publ. Co.

PETERS, J. L. 1948. Check-list of birds of the world, vol. 6. Cambridge, Massachusetts, Harvard Univ. Press.

RIDGWAY, R. 1886. Descriptions of some new species of birds supposed to be from the interior of Venezuela. Proc. U.S. Natl. Mus. 9: 92–94.

TRAYLOR, M. A. 1958. Birds of northeastern Peru. Fieldiana-Zoology 35: 87–141.

Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana 70803, and *Mammal Section, National Fish and Wildlife Laboratory, National Museum of Natural History, Washington, D.C.* 20560. Accepted 18 October 1973.