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Color variation in the Ruddy Duck (*Oxyura jamaicensis andina*).—Males of the Ruddy Duck (*Oxyura jamaicensis andina*) of the Central and Eastern Andes of Colombia have been described and illustrated (e.g., Delacour 1959) as having mottled black-and-white cheeks that are intermediate between those of the large, black-headed *ferruginea* of the more southern Andes and the smaller, paler, and white-cheeked *jamaicensis* of the West Indies and North America. Adams and Slavid (1984) described a large amount of individual variation among *andina* drakes. Here, I present further details on this variation, obtained during field work in Colombia in 1981.

Detailed lateral view drawings were made of the heads of 20 drakes in nuptial plumage watched or photographed at close range in Laguna Pedropalo at 2000 m elev., Parque la Florida and Laguna San Ramon on the Bogotá savanna, 2600 m, and Lago Tota, 3020 m. This was supplemented by drawings of heads of 98 Ruddy drakes (including 41 *andina*) in nuptial plumage in the Museums of Natural History of Bogotá, Buenos Aires, Lima, and Santiago de Chile; the American Museum of Natural History; the Royal Ontario Museum

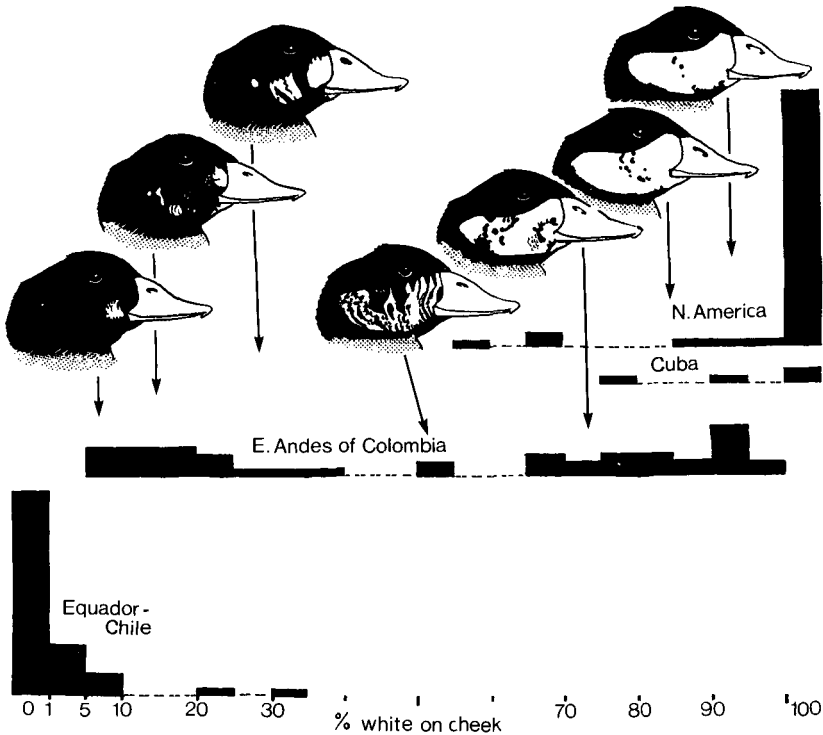


FIG. 1. Histograms showing percent white color on the cheeks of nuptial plumage drakes of Ruddy Ducks from North America, Cuba, the Eastern Andes of Colombia, and the Andes from southern Colombia to southern Chile.

(photos provided by J. C. Barlow); and the Zoological Museum of Copenhagen. This sample does not include birds with traces of basic plumage. The drawings were transferred to paper of homogeneous thickness, where the black and white segments were cut apart and weighed separately. This technique permits a fairly precise calculation of the relative amounts of white and black color. Little attention was paid to the colors of the body, as the variation is modest and is partly due to staining by iron oxides.

Figure 1 shows the patterns of oblique lines described by Adams and Slavid (1984). The lines are due to a rather homogeneous color along the individual follicle rows. Colombian drakes seem to be dimorphic, as the color patterns are normally polarized strongly towards either of the extremes. Some drakes are so dark-headed that white spots (on the lore and near the ear) are visible only on short range. Others are almost white-cheeked. Only two *andina* drakes are intermediate between *jamaicensis* and *ferruginea*.

Nearctic *jamaicensis* drakes are known to get some black cheek feathers during their prealternate molt, but these feathers soon fall out and the cheeks become white (Palmer 1976). This sequence is interesting considering the possible primitiveness of the black-cheeked condition suggested by Siegfried (1976). Individual variation in cheek color in *andina* may reflect individual variation in molt stage and hormonal balance. Dark and light *andina* drakes, however, courted females with apparently similar vigor and used similar postures. Also, the apparent bimodality of the variation, with both types represented in all nine months of the year from which data are available, contradicts this explanation. The presence of both types in all localities, as well as a similar frequency in 1981 data and in older museum specimens ($\chi^2 = 0.007$, $df = 1$, $P > 0.90$) suggest a rather stable situation.

The amount of individual variation suggests that *andina* is a hybrid population. Although the typical *jamaicensis* never visits South America today, it may well have reached Colombia in the Pleistocene and hybridized with *ferruginea*, perhaps in the wetlands that once covered the Bogotá plateau (van Geel and van der Hammen 1973).

The dimorphism could be due to a single allelic pair, or to assortative mating. Mate selection in waterbirds depends mainly on female choice, which may be under strong genetic influence (Walter 1973). As females were hard to tell apart individually, it was impossible to see whether they preferred particular drake types, and I have no direct evidence of assortative mating. In one locality, however, I recorded the color (five-category scale) of drakes that were within 1 m of each other and compared it with the combinations expected by random pairings. There was a tendency for dark drakes to be near each other ($\chi^2 = 10.55$, $df = 1$, $P < 0.001$) as well as for white-cheeked drakes to be near each other ($\chi^2 = 25.67$, $df = 1$, $P < 0.001$). The interpretation of this is unclear. Drakes may know their own appearance and prefer companions of similar type; they may prefer company of siblings; they may be influenced by early imprinting (cf. Bateson 1978); or they may be influenced by innate releasers (cf. Cinat-Tomsen 1926) coupled with their own morphotype.

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Systematic interpretations of foot-scute patterns in Neotropical finches.—Past investigations of foot-scutes emphasizing North American taxa have documented taxonomic differences (Clark 1972, 1974, 1977). My more recent studies have emphasized several cases of taxonomic differences among those Neotropical finches traditionally placed in the Emberizinae. Here I summarize those differences and discuss their systematic interpretations, including consideration of the question of the affinities of the Galapagos finches with those of the mainland.

Materials and methods.—I examined more than 15,000 study skins of oscines, including representatives of more than 2400 species worldwide and samples of all genera of the Emberizinae, Cardinalinae, and Thraupinae. I also inspected 64 species representing all suboscine families except Oxyruncidae. All specimens were viewed either with a binocular dissecting microscope or a hand lens. The collections used are in the National Museum of Natural History (Washington, D.C.), the American Museum of Natural History (New York), the British Museum (Natural History) at Tring, the Yale University Peabody Museum of Natural History (New Haven), and the Museum of Natural History at the University of Connecticut (Storrs). My classification follows that of Morony et al. (1975).

Sporophilines.—Many Neotropical finches such as *Tiaris*, *Melanospiza*, *Lophospingus*, all the species of Galapagos and Cocos Island finches (geospizines), and all mainland genera of tanagers (Thraupinae) have a divided scute at the base of the two outer toes (scute E of Clark 1977) (Fig. 1A). Only in 5 genera, *Volatinia*, *Sporophila* (except *S. obscura*, discussed below), *Oryzoborus*, *Dolospingus*, and *Charitospiza*, is the lateral part of scute E most commonly fused with the most proximal scute on the outer toe (Fig. 1B). Such a fusion is not known to characterize any other passerine taxon. Morony et al. (1975) list 36 species in the 5 genera; I have examined representatives for all these except *Sporophila frontalis*, *S. ardesiaca*, *S. melanops*, *S. nigrorufa*, *S. insulata*, *S. palustris*, and *S. cinnamomea*. Some variant individuals within at least *Volatinia* and *Sporophila* show a *Tiaris*-like condition (Fig. 1A). For example, in a series of 58 specimens of *Volatinia*, 5 showed this *Tiaris*-like condition. In contrast, a *Sporophila*-like condition is apparently very rare as an individual variant in passerine species that typically have a *Tiaris*-like condition; I have seen one exceptional specimen of the tanager *Cnemoscopus rubrirostris* showing a *Sporophila*-like condition. The occurrence of such individual variations does not negate the potential taxonomic usefulness of species differences (Clark 1972).

The unique pattern of foot-scutes in the 5 genera might indicate their monophyletic origin. Olson (1981) summarized other evidence, including intergeneric hybridization (Sick 1963),