NOTES

Rediscovery and Description of the Hispaniolan Lizard *Anolis darlingtoni* (Sauria: Iguanidae)

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Cochran (1935) described *Xiphocercus darlingtoni* from "Roche Croix, Massif de la Hotte, Haiti, at about 5,000 feet altitude." Until Cochran's description, *Xiphocercus* Fitzinger was a monotypic genus based on the Jamaican anole that is today known as *Anolis valencienni* **Duméril** and Bibron. Etheridge (1960) relegated *Xiphocercus* to the synonymy of *Anolis*. With the invalidation of *Xiphocercus, Anolis darlingtoni* Cochran, known from the Cordillera Central of the Dominican Republic, was renamed *Anolis etheridgei* by Williams (1962). Throughout these changes *Anolis darlingtoni* from the Massif de la Hotte has been known only from the type specimen. A number of forays by herpetologists into uplands of the La Hotte in the 1960's, 1970's, and 1980's failed to find more specimens.

Both *Anolis darlingtoni* and *A. valencienni* are moderately large, with enlarged scales on the snout and a contrasting pattern of white and dark brown markings, However, their resemblance is only superficial and believed to be the result of convergence; the two have not recently been regarded as closely related (Etheridge, 1960; Williams, 1976, 1983). They are placed in the twig anole ecomorph (Williams, 1983; Hedges and Thomas, 1989), which includes representatives from the four Greater Antilles (our recent field experience with *A. guazuma* confirms that it is a Cuban twig anole, as suggested by behavioral observations of the type series [Garrido, 1983]).

In October and November of 1984, we collected on the slopes of the Massif de la Hotte south of Castillon (11.2 km S, 1.9 km E of **Marché Léon).** On the evenings of the 5th and 9th of November, at an elevation of 1360 m, we found *Anolis darlingtoni* in a one-hectare patch of disturbed forest. There were some small trees, sierra palms, tree ferns, and herbaceous growth, but few large broad-leafed trees remained. Surrounding areas were largely cleared, with scattered trees, dead standing trunks, low herbaceous growth, and some banana plantings. This small patch of forest and others nearby seemed to be the last stages of deforestation in the area.

We found *Anolis darlingtoni* sleeping on vegetation about 1-4 m above the ground. Three juveniles (two were collected) were found sleeping vertically on the tips of dead tree fern branches (l-4 m high) while three adults were found sleeping horizontally on limbs of small trees low (1 m) to the ground. Two of the three adults (all males) were deposited in the United States National Museum (USNM 286898-899) and the third (skeletonized) was deposited in the Museum of Comparative Zoology (MCZ 173207). The two juveniles were used in biochemical analyses (Burnell and Hedges, 1990; Hedges and Burnell, 1990) and are in the frozen tissue collection of the junior author (SBH 103987, 104084).

Coloration in life (based on USNM 286898; Fig. 1): dorsal ground color pale pink, including legs and tail, head slightly darker; scale edges on head dark, somewhat coppery brown, centers pinkish; body markings dark brown; upper lip, vertical neck mark, and T-shaped postocular mark cream to white; large, triangular area behind eye extending back to angle of mouth black; another, larger black patch behind T-shaped mark; barring on body complex; dark neck stripe behind cream vertical neck mark partly fused with more anterior dark head coloring and connected to first of three transverse body bands; dark neck pattern viewed from above U-shaped with center of U fusing with brown dorsal head color and arms of U oriented posteriorly, with ventrad extensions as part of first body band; each brown body band solid dorsally but broken and interrupted laterally by vertical stripes of pink ground color giving an overall effect of a reticulum or lacework of brown intermingled with pink ground color and organized into transverse bands; more dark transverse bands on tail after solid dark sacral band (not hollowed by invasion of light ground color); two femoral bands and two crural bands on hind limbs, all somewhat invaded by light ground color; ventral coloration dirty white; brown linear smudges along underside of jaw; throat with brown smudges extending onto base of dewlap; iris coppery brown; iris ring gold; base of tongue blue; dewlap white with even dark smudging; two irregular, comma-shaped black or very dark brown marks in center of dewlap; range of color change involves only darkening of markings and lightening of the ground color.

The juvenile (Fig. lC) is similarly patterned to the adult but lacks the T-shaped vertical mark behind the eye; rather the postocular black area has a depression with a light dot in it that corresponds to the head of the T in the adult. This black area also extends onto the neck behind the vertical pale neck bar of the adult, so that seen laterally there is a pale area extending below the eye along the lip and onto the neck, interrupted by three vertical dark markings, one subocular, one a part of the black postocular patch, and then the vertical black neck bar. The body pattern of the juvenile is similar but not as complex as that of the adult; the body bands show invasion of light ground color but the detail is not as discernible, that is, the invasion is less organized into a network. The neckband is likewise not so complex; however, there is a central (dorsal) head figure contributed to by a dorsal anterior extension of the black postocular patch. The juvenile venter is much darker than in the adult, and the body bands continue across the venter. Undersides of the limbs are also darker than in the adult;

the throat has two dark, almost black wide bands, one below the eye and one at about the angle of the jaw (different from adult pattern); also a pale, almost white, lower neck spot.

Morphology (MCZ 173207): large plates on top of head with rugose, pebbly surface; shape of the snout rounded and sloping towards the tip so that there is not a vertical snout tip (striking feature); rostral and two rows of small scales just above slope forward at distinct angle; snout rises to narial hump and slopes posteriorly to about the middle of the snout; loreal scales 30/24; large canthal ridge scales 4/4; interparietal elongate; supraoculars 3/3; single rows of small granules between supraoculars and large plates of supraocular semicircles; three large plates occur on each side (supraoculars), the small scales between them are not complete on one side; 2-3 rows of granular scales extend between the platelike supraoculars and supraocular edge; eyeskin of pebblelike granules; posterior to large bony edge of the orbit is nearly vertical ridge bearing white stem of "T"; ear opening diagonal, almost vertical; labials and infralabials distinct; mental scale with cleft; postmentals 2; sublabial row large anteriorly but after 3 scales on left and right this splits into two and then a series of 3-4 rows of elongate granular scales below infralabials and finely granular scales of gular region, the latter grade into more elongate scales of the dewlap proper; ventral scales and ventral limb scales smooth and subimbricate, somewhat swollen; double row of enlarged median nuchal scales noticeably swollen, becoming flattened past scapular region but remaining differentiated from dorsal body scales, although not abruptly distinct; scales of middorsal zone somewhat larger than lateral scales, becoming smaller as one proceeds ventrad; below midlateral zone they become more elongate and more swollen; midventral raphe along most of midline; surfaces of dorsal body scales finely shagreened; tiny interscale granules ventrolaterally; neck scales more granular and swollen but small; paramedian nuchal scales large; dorsal arm scales flattened and imbricate, uni- to tricarinate; digital pads relatively short (i.e., digital pad areas have relatively broad bases on manus); last phalanx relatively long, about as long as total lamellar area of second and third phalanges; last phalanx of fifth digit longer than total lamellar area; fourth toe distinctly elongate; ungual phalanx also relatively long; dorsa of feet with imbricate multicarinate scales; a pair of enlarged postanal scales; tail with keeled scales, tip not regenerated; tail laterally prehensile. USNM 286899: head scales distinctly more rugose than in MCZ 173207; interparietal differs in shape; two supraoculars on one side with small scales separating supraoculars from semicircles; ear opening protected by horizontal fold; on one side opening is almost round; loreals 28/26; postmentals 3. USNM 286898: nuchal scales present but not as swollen; head scales much flatter and less rugose than larger animals; gular scales more spinose; postmentals 3; loreals 14/16; interparietal large, triangular; enlarged postanal scales.

The following are measurements (live weight, snout-vent length, and tail length) for *Anolis darling-toni:* USNM 286898: 2.9 g, 55 mm, 65 mm; USNM 286899: 7.2 g, 70 mm, 91 mm; MCZ 173207: 7.0 g, 72 mm, 84 mm; SBH 103987:0.50 g, 34 mm, 39 mm; and SBH 104084: 0.74 g, 34 mm, 41 mm. The holotype (MCZ 38251) is 74 mm SVL, 91 mm tail.

We have no diurnal observations of *Anolis darlingtoni,* but its sleeping perch (on twigs and branches) agrees with other species in the twig ecomorph. The functional significance of the very long ultimate phalanges of the toes, particularly toe 4, remains to be explained.

Recent biochemical studies confirm that *Anolis darlingtoni* is not closely related to *A. valencienni* (Burnell and Hedges, 1990; Hedges and Burnell, 1990); their morphological similarities being the result of convergence. However, the suggestion by Williams (1983) that *A. darlingtoni* is related to *A. fowleri* of the Hispaniolan North Island was not supported. Although *A. darlingtoni* appears to show some protein similarities with other South Island *Anolis,* its relationships remain unclear, and for that reason it was placed in its own series, the *darlingtoni* series (Burnell and Hedges, 1990).

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Blood Parasites of Some Birds from Puerto Rico

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Very little has been published about the occurrence of avian haematozoa in passerine birds of Puerto Rico. The only previous studies are those of McLaughlin (1968) and Acholonu and Acholonu (1973) on the introduced Rock Dove *(Columbia livia).* McLaughlin noted infections of *Haemoproteus columbae.* Acholonu and Acholonu reported a 66% prevalence of *H. columbae,* and also a light infection of *Plasmodium* sp. in one Eurasian Collared Dove *(Streptopelia decaocto decaocto).* To better understand the avian haematozoa of Puerto Rico, 111 Puerto Rican resident and migrant birds were examined for blood parasites.

From 26 October to 23 November 1987, blood smears were collected (PPM) from 111 birds, representing 23 species and 111 families, in southwestern Puerto Rico. The four localities, all in Municipio Cabo Rojo, and their general features are as follows: A) Barrio Boquerón, thorn woodland with acacia and mesquite (at sea level); B) Barrio Llanos Costa, 0.5 km NNW mouth Arroyo Cajul, thorn woodlands with acacia, mesquite, and semi-evergreen forest (at sea level); C) Barrio Boquerón, Peñones de Melones, deciduous woodland, semi-evergreen forest (at 30 m); D) Barrio Llanos Costa, ¾ km E mouth Arroyo Cajul, thorn woodland with mesquite and cacti (at sea level). Sites B and D had standing water in the immediate vicinity.

Blood was obtained by heart puncture from euthanized birds and the thin blood smears were air-dried and fixed in absolute methanol in the field. In the laboratory, slides were stained in 3/50 dilution of Geimsa (pH 7.2) and examined for parasites. A minimum of 100,000 erythrocytes were examined per slide. All positive smears were deposited in the collection of the International Reference Centre for Avian Haematozoa (IRCAH), Memorial University of Newfoundland, St. John's, Newfoundland, Canada. The accession numbers are 103799-103802. Voucher specimens of all individual birds were deposited in the Louisiana State University Museum of Natural Science. Parasite identifications were confirmed at IRCAH.

Of the 111 birds examined, only four individuals (3.6%) were found to be infected. Light infections of *Haemoproteus* sp. were found in two birds — *Coereba flaveola* (5/10,000 RBC), male, 10 g, AHY, PPM#637 (locality C) and *Dendroica discolor* (<1/10,000 RBC), female, 6.5 g, AHY, MCG#215 (locality B). *Trypanosoma everetii* type and a microfilaria (unidentified) were found in *Mniotilta varia,* female, 9.6 g, AHY, MCG#157 (locality B). One individual of *Spindalis zena,* male, 28 g, AHY, PPM#358 (locality B) was positive for a microfilaria (unidentified). *Coereba flaveola* and *Spindalis zena* are resident species; *Dendroica discolor* and *Mniotilta varia,* are North American migrants that winter in the tropics.

The prevalence of haematozoa in the Nearctic avifauna is substantially higher than in the Neotropic avifauna. The prevalence in Nearctic birds is an overall 36.9% (Greiner et al., 1975), compared to an overall prevalence of 10.5% for neotropical birds (White et al., 1978). The low prevalence and intensity of infection found in Puerto Rican migrant and resident birds is in accordance with a larger (18 month) survey of tropical avifauna conducted in Jamaica (Bennett et al., 1980), These authors reported an overall infection rate of 7.4%; however, they found no detectable parasitemias during November and December. The highest incidence and intensity of parasites were found from March through July, and these seasonal patterns suggest that breeding activity may provoke relapse of haematozoa. Among our resident species sampled, no breeding activity was noted during the November-December sample period; therefore the infection rate that we found may be lower than for the same populations at other seasons.

North American migrants included in the Jamaican survey also had a low prevalence of infection (5.5%). This supports the idea that parasites are dormant during the fall and blood parasites are acquired on their North American breeding grounds, where spring relapse is thought to occur (Greiner et al., 1975; White et al., 1978). Two of the four birds infected in our survey, *Dendroica discolor* and *Mniotilta varia,* are North American migrants.

Although the surveys referred to in this paper were conducted in the avifauna of the Caribbean, the low prevalence of blood parasites is similar to that reported in other tropical regions (White et al., 1978) and may be due to similar factors, such as low transmission potential (Bennett and Borrero, 1976). The absence of suitable vector species may be the most influential factor contributing to the low prevalence of haematozoa in the neotropics (White et al., 1978). At present, however, little is known concerning the

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