

## Hispaniolan snakes of the genus *Dromicus* (Colubridae)

by

Richard Thomas      and      Albert Schwartz

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Probably the commonest of the colubrid snakes of Hispaniola and its satellite islands is *Dromicus parvifrons* Cope. Described in 1862 from a series of four syntypes from near Jérémie, Haiti, *D. parvifrons* has since been reported from many localities in both Haiti and the Dominican Republic, and from the off-shore islands of Gonâve, Tortue, Ile-à-Vache, and Beata. In elevation, these snakes occur from below sea level in the Cul de Sac to elevations of at least 5600 feet (1700 m) at Furcy in Haiti. The purpose of the present paper is to discuss the variation in, and systematics of, this species. We have been able to study 601 specimens of *D. parvifrons*. In addition to specimens in the Albert Schwartz Field Series (ASFS) we have borrowed pertinent material in the Museum of Comparative Zoology (MCZ), United States National Museum (USNM), American Museum of Natural History (AMNH), Museum of Zoology, University of Michigan (UMMZ), Carnegie Museum (CM), and the Senckenberg Museum (SMF). The respective curators of these collections—Ernest E. Williams, Doris M. Cochran and James A. Peters, Charles M. Bogert, Charles F. Walker, Neil D. Richmond, Robert Mertens and Konrad Klemmer—merit our gratitude in allowing us to examine specimens in their care. We have also studied a few snakes in the collections of Donald W. Buden (DWB), Dennis R. Paulson (DRP), and of the senior author (RT). We also wish to thank the following people for assistance in the field: Donald W. Buden, Ronald F. Klinikowski, David C. Leber, Miss Patricia A. Heinlein, Dennis R. Paulson, and also Tony Gasparo, whose aid enabled us to visit several localities difficult of access in the San Juan area. Scale counts were taken in the manner proposed by DOWLING (2).

COCHRAN (1, pp. 353-71) recognized seven subspecies of *D. parvifrons*, as follows:

- D. p. parvifrons* Cope, 1862  
*D. p. protenus* Jan, 1867  
*D. p. alleni* Dunn, 1920  
*D. p. tortuganus* Dunn, 1920  
*D. p. niger* Dunn, 1920  
*D. p. lincolni* Cochran, 1931  
*D. p. rosamondae* Cochran, 1934

Of these seven forms, four are restricted to satellite islands (*alleni*, *tortuganus*, *lincolni*, *rosamondae*), and the remaining three subspecies occur on the Hispaniolan mainland (*parvifrons*, *protenus*, *niger*). We have been especially fortunate in having seen specimens of all seven recognized forms in life. The four satellite races are all quite distinct and each is restricted to a single island. The three mainland races, however, present certain problems.

COCHRAN (*loc. cit.*) regarded *parvifrons* as restricted to the extreme western tip of the Tiburón Peninsula of Haiti, extending as far east as the vicinity of Baradères. The race *protenus* occupies the balance of Hispaniola except for the Samaná Peninsula in the Dominican Republic and the south side of the Bahia de Samaná, in which area occurs *niger*. There were some peculiarities of localities involved; for example, the type locality of *niger* is La Vega, a city which is far removed from the Samaná Peninsula (and thus from the range of *niger*) in an area which might be presumed to be occupied by *protenus*. A specimen from Rivière Froide in the mountains south of Port-au-Prince in Haiti was also regarded as *niger*; this locality is even farther away from the Samaná Peninsula than La Vega. There is also (COCHRAN, *op. cit.*: 354, map) a symbol for the race *protenus* on the Samaná Peninsula, which implies that both forms occur sympatrically not only on the Samaná but also in the Massif de la Selle. Specimens from large areas of Hispaniola (Barahona Peninsula, southeast Dominican Republic) were not available at the time of Dr. Cochran's work. Additional material from localities or regions whence she had only a few snakes has clarified certain problems as well.

In describing coloration of the patterned races of *D. parvifrons* it has been found convenient to divide the pattern into the following zones for easier comparison. Zone one is the middorsal zone between the pair of dorsolateral stripes. Zone two is the region below the dorsolateral stripes and above the ventral scutes. The dorsolateral light stripes are described separately (scale rows which they occupy are noted at about midbody), as is the ventral coloration - in dorsoventral sequence.

### *Dromicus parvifrons* Cope, 1862

*Dromicus parvifrons* Cope, 1862, Acad Nat. Sci. Philadelphia, p. 79.

*Dromicus protenus* Jan, 1867, Iconographie générale des ophiidiens, 2:4, livr. 25, pl. 3, fig. 2.

*Leimadophis parvifrons niger* Dunn, 1920, Proc. New England Zool. Club, 7:39.

*Leimadophis alleni* Dunn, 1920, Proc. New England Zool. Club, 7:40.

*Leimadophis tortuganus* Dunn, 1920, Proc. New England Zool. Club, 7:40.

*Leimadophis parvifrons lincolni* Cochran, 1931, Proc. Biol. Soc. Washington, 44: 91.

*Dromicus parvifrons rosamondae* Cochran, 1934, Occ. Pap. Boston Soc. Nat. Hist., 8:186.

TYPE LOCALITY: Haiti, Dept. du Sud, near Jérémie.

DESCRIPTION: A moderate to small sized colubrid snake with 19 (rarely 17 or 18) scale rows at midbody; 141-168 ventrals in males, 138-172 in females; 100-151 paired subcaudals in males, 104-138 in females. Dorsal scales smooth with typically one apical pit in the region of the neck and the vent; anal scale is divided; head scalation of the unspecialized colubrid type with normally 1/1 loreals, 1/1 preoculars, 2/2 postoculars and 1 + 2/1 + 2 temporals; supralabials usually 8/8, infralabials 10/10. The basic pattern is a striped or zonate one with a dark middorsal stripe, a pair of light dorsolateral stripes usually occupying parts of two scale rows on the 5 to 7th scale rows, and a brown to gray ground color; a paler venter variously spotted or invaded with dorsal coloration or immaculate, often with yellow or orange coloration. Some races are melanistic. The hemipenis is long (extending to the level of the eleventh subcaudal), bilobed, and has a deeply forked sulcus spermaticus (fork at about level of second subcaudal); the forks of the sulcus extend through an elongate cordate papillate zone to the apices. Two rows of enlarged spines extend more than three quarters of the length of the organ (to level of ninth subcaudal), proceed basally along the edges of the non-sulcate side, and then diagonally to the sulcate side where they are lost in the smaller basal spines. A fleshy basal lobe is found on each organ. The generic status of the Antillean snakes assigned to the genus *Dromicus* is presently under study and is not yet resolved, so a comparison with other species is not undertaken here.

### *Dromicus parvifrons parvifrons* Cope

TYPE LOCALITY: Haiti, Dept. du Sud, near Jérémie.

DIAGNOSIS: A subspecies of *D. parvifrons* characterized by a brown ground color, especially in zone one, a narrow middorsal stripe, an unspotted throat, relatively small size (males to 368 mm, females to 480 mm), and low ventral scale counts.

DISTRIBUTION: The distal portion of the Tiburón Peninsula (Fig. 9) from Moron to Baradères (*vide* COCHRAN, *op. cit.*: 356). Specimens from Miragoâne, though generally typical of this race in coloration, have higher scale counts and are regarded as intergradient with *protenus*.

SCALATION: Ventral scales in males 141-148, females 138-149; subcaudals in males 116-130, females 104-125. Scale rows 19-19-17 (34 specimens), 21-19-17 (3), 19-18-17 (3), or 19-17-15 (1).

COLORATION: The typical ground color of zone one is brown; the dark middorsal stripe is narrow (one scale wide); occasionally the scales comprising it are light edged on their anterior facets. Occasional specimens have a scatter-

ing of dark pigment in zone one, specially on the anterior portion of the body. The light lateral stripes typically occupy scale rows 5-7 (Fig. 1), but in one specimen it occupies rows 4-6, and in another 4-5. Zone two is typically brown in ground color; the dorsalmost portion of this zone is black and either merges gradually with the ground color or is sharply demarcated therefrom. A few specimens lack the dark dorsal margins. Most specimens have venters that are unmarked or but faintly suffused with pigmentation: in a few there is weak to heavy spotting or mottling of the ventral surface. There is typically, but not invariably, a row of dark spots along the lateral edges of the anterior ventral scales. Throat spotting is absent in the majority of specimens or only very faint in a few. A few specimens are so darkened by preservation that their patterns are not readily discerned.

The specimens from the vicinity of Miragoâne are very similar in coloration to the specimens of *parvifrons* just described. One specimen has the suffusion of black in zone one. In ventral counts the Miragoâne snakes are somewhat higher, males having 145-153 ventrals, females 146-153; subcaudals of males are 117-123, of females 107-125. As stated above the Miragoâne specimens are considered as intergradient between *parvifrons* and *protenus*.

#### SPECIMENS EXAMINED:

HAITI: *Département du Sud*: Moron, USNM 60609-10; nr. Jérémie, MCZ 3344 (2) (cotypes), 3602 (2) (cotypes); Place Nègre, nr. Jérémie, MCZ 64801; Perrine, nr. Jérémie (not mapped), MCZ 64802, 70119; Maibo, nr. Jérémie (not mapped), MCZ 64803; Carrefour Sanon, nr. Jérémie (not mapped), MCZ 70108-10; Lantini, nr. Jérémie (not mapped), MCZ 70111; Mayette, nr. Jérémie, MCZ 70112; La Source, nr. Jérémie (not mapped), MCZ 70113; Riverdi, nr. Jérémie (not mapped), MCZ 70114; Castille, nr. Jérémie (not mapped), MCZ 70115-18; Troubois on Jérémie Road, MCZ 74544-45 (3); Camp Perrin, ASFS X2638, X2665, X2792, X2981, X3025-32, X3071-72, X3086-91  
*Dromicus p. parvifrons* × *protenus*: HAITI: *Département du Sud* (?): Butête, nr. Miragoâne (not mapped) CM 37949-50, MCZ 66331-35; Commune Aquin, nr. Miragoâne (not mapped), CM 37951-52, MCZ 66336-42; Denis, nr. Miragoâne (not mapped), MCZ 66329-30; Pemel, nr. Miragoâne (not mapped) MCZ 66343; Nan Carosse, nr. Miragoâne (not mapped), MCZ 66344; Mingrette, nr. Miragoâne (not mapped), MCZ 66345-46; Miragoâne, USNM 73379.

### *Dromicus parvifrons protenus* Jan

TYPE LOCALITY: Port-au-Prince, Haiti.

DIAGNOSIS: A subspecies of *D. parvifrons* characterized by a gray to brown ground color and a zonate dorsal pattern (zone one typically with a black median stripe, zone two with a dark upper edge, Figs. 2, 3), venters and throats with weak or absent to heavy spotting, moderate size (males to 392 mm, females to 488 mm), ventral and subcaudal counts moderate to high.

DISTRIBUTION: All of mainland Hispaniola (Fig. 9) exclusive of the distal portion of the Barahona Peninsula and the region to the east of Santo

Domingo in the south and the Bahía Escocesa in the north.

VARIATION: The subspecies *protenus* as here considered is the widest ranging/of the races of *Dromicus parvifrons* and covers a heterogeneous assemblage of populations among which various local trends are noticeable. In our opinion none of these has diverged to the extent that it is nameworthy. In discussing variation in this subspecies we have found it convenient to break it into geographical units, as follows:

- I — Port-au-Prince and nearby lowlands
- II — Cul de Sac
- III — Mirebalais, St. Michel de l'Atalaye St. Marc (central Haiti)
- IV — Bombardopolis and vicinity
- V — Cap-Haitien and vicinity
- VI — Monte Cristi and vicinity
- VII — Cordillera Central, Valle de San Juan and vicinity
- VIII — Easternmost marginal records for *protenus*
- IX — La Selle-Sierra de Baoruco
- X — Saltrou

In ventral scales male *protenus* range from 147 to 166, females from 146 to 172; subcaudal scales of males range from 107 to 133, females 107 to 135.

MERTENS (4:76-7) cast doubt on the validity of the race *niger* because of melanistic specimens he had found in regions occupied by typical *protenus*. However, none of the specimens obtained by Mertens is so dark as to be confused with true *niger* (all have plainly evident zonate patterns), and all are referable to either *protenus* or, in the case of the Santo Domingo specimen, to intergrades between *protenus* and the southeastern black race.

I — PORT-AU-PRINCE AND VICINITY (96 specimens). Coloration generally the same as that of *D. p. parvifrons*. Modal ground color of zone one brown with middorsal stripe one scale wide. A few (6) specimens have wider middorsal stripe (2-3 scales) and suffusion or mottling of back pigmentation in zone one. Lateral light stripes typically occupy scale rows 5-6 (two cases involve rows 5-7). Zone two typically has a narrow dorsal edge and brown ground color. Throat and ventral spotting is heavy in 18 percent of the specimens, moderate in 42 percent and light to absent in 35 percent.

II — CUL DE SAC (11 specimens). Most specimens have the coloration typical of the Port-au-Prince specimens. Four (one from Gloré, three from Eaux Gaillées) have zone one heavily pigmented. Two have heavily spotted throats, five are moderately spotted, and four are weakly spotted or not at all. Three specimens from Duvergé (AMNH 40995-97) in the Dominican section of the Cul de Sac (Valle de Neiba) have very high ventral counts (169-172).

III — MIREBALAIS-ST. MICHEL-ST. MARC (26 specimens). Coloration averages darker than Port-au-Prince specimens, but some specimens are quite light; middorsal stripe is narrow typically but may be widened by dark suf-

fusions. Dark upper edge of zone two is typically narrow. Throat spotting is heavy in 42 percent, moderate in 42 percent, and light to absent in 16 percent.

IV — BOMBARDOPOLIS (11 specimens). Coloration generally light. The one ground color typically brown, middorsal stripe narrow (one scale wide) to nearly absent. Three specimens have dark suffusions and mottling of zone one. Light stripe on rows 5-6 or 5-7. Throat spotting moderate in all specimens; venters not heavily pigmented.

V — CAP-HAITIEN-GRANDE RIVIERE DU NORD-DONDON-CITADELLE (45 specimens). The coloration of these specimens is much darker on the average than any other north island Haitian material. Zone one is typically much darkened, sometimes almost solid black along parts of the body. The middorsal stripe, when evident, is typically one scale in width; in three specimens it is three scales wide. Light lateral stripes are typically on rows 5-6 but also on rows 5-7 in eight snakes. The dark upper edge of zone two typically forms a wide and prominent dark stripe; the ground color is bluish to brown. In one heavily pigmented specimen (USNM 76659) both zone one and zone two are nearly unicolor black. Fifty percent of the specimens have heavily spotted throats and venters, 26 percent are moderately spotted, and 24 percent have light to absent spotting. The heavily pigmented group has specimens which are more extensively and heavily spotted than any other members of this race. Encroachment of the dorsal pigmentation onto the venter is also common.

VI — MONTE CRISTI (12 specimens). General coloration light. Zone one typically gray or brown; middorsal stripe one scale wide. Two specimens are heavily pigmented in zone one and have indistinct stripes. Light lateral stripe on rows 5-6 (mode) or 5-7. Zone two with weakly developed upper edge except in the two heavily pigmented specimens. Throats moderately spotted in eight specimens, lightly to not at all in 4 specimens. Venters clear.

VII — CORDILLERA CENTRAL (23 specimens). General coloration dark. Ground color of zone one frequently a dark chestnut color or suffused with black. Median stripe 1-3 scales wide. Lateral light stripe modally on scale rows 5-6 but also on 5-7 or 4-5. Throat spotting heavy in 44 percent, moderate in 39 percent, and light to absent in 17 percent.

VIII — EASTERNMOST MARGINAL RECORDS FOR *protenus* (8 specimens) Four specimens from Sosúa are very dark; two are nearly entirely black. A young specimen from southeast of Nagua shows the *protenus* pattern but is somewhat darker than normal. It is likely that the influence of *niger* extends to the west along the north coast (i.e., north of the Cordillera Septentrional) of the Dominican Republic at least as far as Sosúa. A large adult specimen from José Contreras (in the Cordillera Septentrional northeast of Moca) is pigmented like many specimens from the Cordillera Central and shows no obvious intergradient tendencies towards *niger* on the Samaná peninsula. Four specimens from near

the city of La Vega are typically *protenus* in coloration with the usual zonation and show no tendencies towards intergradation with *niger*. A specimen from west of the city of Santo Domingo (4 km. E Río Jaina) shows normal *protenus* coloration, as do some specimens recorded as coming from the city itself. Santo Domingo is the approximate easternmost extent of *protenus* in the south. Intergradation is evident in specimens from the city itself; specimens from east of the Río Ozama represent an undescribed black race.

IX — LA SELLE-SIERRA DE BAORUCO (112 specimens). General coloration dark. Zone one completely dark (dusky) to brown in ground color; modal condition is dark but with middorsal stripe evident. Middorsal stripe 1-3 scales wide in La Selle series, but 3 scales wide in all adult Sierra de Baoruco specimens in which the stripe is evident. Lateral light stripe involving rows 5-6, 5-7 or 6-7; scale row seven is involved in 64 percent of the specimens. Zone two is also typically darkened; dark upper edge typically wide but obscure. Venter are usually heavily pigmented with much encroachment of dorsal color; but throats are not usually spotted. For the Sierra de Baoruco specimens none have heavy throat spotting, seven percent have moderate spotting and 93 percent have light to absent spotting. For the La Selle specimens eight percent have heavy throat spotting, four percent have moderate spotting and 88 percent light to absent. The Sierra de Baoruco specimens are therefore seen to be more extreme than those of the La Selle in lack of throat spotting and in the width of the middorsal stripe. One specimen from Rivière Froide (USNM 69434) was regarded by COCHRAN (1) as a specimen of *niger*. In reality it represents only the extreme development of the trend towards overall heavy pigmentation in these populations; though obscured, it possesses a typically *protenus* pattern.

X — SALTROU AND VICINITY (14 specimens). General coloration bold and contrasting. Zone one brown or grayish with bold wide (3 scales) middorsal stripe. Lateral stripe on rows 5-6 in five specimens, includes row seven in 10 specimens. Zone two typically has wide prominent dorsal dark stripe, and gray ground color. Some specimens have zones one and two almost totally darkened. Throats unspotted or only lightly so. These are regarded as intergradient with *lincolni*.

In ventral scales male *protenus* range from 147 to 166, females from 147 to 172; excepting the very high count specimens (3 females) from Duverge and one female from Dondon the upper range for female *protenus* would be 166. Subcaudals range from 112 to 133 in males and from 101 to 135 in females. The scale row formula characteristic of this race, as it is of the species, is 19-19-17; occasional variants of no systematic significance occur.

The specimens from the Port-au-Prince region (I) in coloration show strong influence of the subspecies *parvifrons* but are included in *protenus* on the basis of higher scale counts. The Cul de Sac (II) sample is small, and agrees generally with area I in showing no particular trends except for three puzzling specimens from Duvergé with very high scale counts. The central Haitian group

(II) shows no outstanding trend but is perhaps intermediate between I and V, which itself shows a strong trend. Region III is not outstanding but has a trend towards higher ventral counts. Region V is remarkable for its trend towards heavily spotted throats and venters and dark general coloration; VI is perhaps most remarkable for its contrast to the adjacent V in that it shows modally the characteristic lighter coloration of snakes from xeric areas (cf. I, II and III). The Cordillera Central specimens (VII) do not show any outstanding trend; they pertain to the generally more heavily pigmented montane phase. VIII is a catchall for the eastern marginal area from which few specimens are available; this region includes the type locality of *niger*, an anomaly which is discussed under that subspecies. The eastern south island populations (IX) show the typical montane darkening but are remarkable for their lack of throat spotting (not ventral spotting or pigment encroachment which may be quite heavy). The lack of throat spotting suggests that these eastern south island populations may be in reality most closely related to *parvifrons*; they are not distinct from *protenus* except on the average and inclusion of them with *parvifrons* would negate its diagnostic low ventral scale count. The Saltrou and vicinity specimens (X) are notable for their high scale counts and modally bold pattern; they show the influence of the subspecies *lincolni* which occurs to the south, and we consider them to be intergradient.

#### SPECIMENS EXAMINED (grouped geographically as discussed):

I. HAITI: *Département de l'Ouest*: Ca Ira, MCZ 65103; Carrefour, MCZ 60101-08; Morne de Cayette, MCZ 62683-86; Source Leclerc, Morne de Cayette (not mapped), MCZ 65954; Diquini, MCZ 8660-62, 8664-66, ASFS X2408; Port-au-Prince, MCZ 12862, 60062-83, 69407, AMNH 49729-30, 49732, 70138, 70590; Carrefour Feuille, Port-au-Prince (not mapped), MCZ 60142, 60181; Pension Tourdot, Port-au-Prince (not mapped), MCZ 62662; Source Bariafoux, Port-au-Prince (not mapped), MCZ 65973; Pétienville, MCZ 60109; Delmas, MCZ 60133-41, 62663; Damien, MCZ 60086-100, 60110-22, 60131-32, AMNH 4927.

II. HAITI: *Département de l'Ouest*: Cul de Sac near Port-au-Prince (not mapped), MCZ 37676; Eaux Gaillées, MCZ 60146-48; Thomazeau, MCZ 12863, Manneville, MCZ 8677; Gloré 60143; REPÚBLICA DOMINICANA: *Independencia Prov.*: Duvergé, AMNH 40995-97.

III. HAITI: *Dépt. de l'Ouest (?)*: Mirebalais, MCZ 68813; 7 mi. N Mirebalais, ASFS X2219; Boudou, nr. Mirebalais (not mapped), MCZ 68526; Fer-à-cheval, nr. Mirebalais, MCZ 68528-29, 69406; Ledié, nr. Mirebalais (not mapped), MCZ 68530; Boucan, nr. Mirebalais (not mapped) MCZ 68531-33; *Département de l'Artibonite*, Ennery, MCZ 38285; St. Michel de l'Atalaye, USNM 69196-97, 74498-501, 76646-48, 76650; St. Marc, MCZ 8751-52, 56149, AMNH 65321.

IV. HAITI: *Département du Nord Ouest*: Bombardopol's, MCZ 62674-82; Port-à-l'Ecu, AMNH 49734; Moustique, USNM 59441.

V. HAITI: *Département du Nord*: Cap-Haitien, MCZ 8743, 37673-74, USNM 74097; Ti Guinin, near Cap-Haitien (not mapped), MCZ 66822-35; nr. Citadelle Laferrière, MCZ 25566; Citadelle Laferrière, MCZ 66836-39; Grande Rivière du Nord, MCZ 8772, 66812-21; Dondon, MCZ 62664-73, USNM 76659.



VI. REPÚBLICA DOMINICANA: *Monte Cristi Prov.*: Monte Cristi, AMNH 40119-20, 40771, 42805-07; 6 km SE Pepillo Salcedo, ASFS V1424; 5 km SE Pepillo Salcedo, ASFS V1539, V1618; 1 km S Palo Verde, ASFS V1349-50; 5 km W Guayubín, ASFS V1609; *Santiago Rodríguez Prov.*: Monción, SMF 25905.

VII. REPÚBLICA DOMINICANA: *La Vega Prov.*: ca. 2 km E La Vega, ASFS V4333-36; La Vega, MCZ 7833 (paratype of *niger*); 1 mi. S Constanza, 4000 feet, ASFS X8242-43; 1 mi. WSW Constanza, 4000 feet, ASFS X8485, X8520-21, X8602-04, X8651-52, X8735, RT 672; within 5 mi. W Constanza, ASFS X8836, X8860-63; 3.9 mi. N Constanza, ASFS X8499; Paso Bajito, SMF 25673-74, 26324; 11 km E Paso Bajito, 4500 feet, ASFS X8858-59; 12 km NE Jerabacoa, 2000 feet, ASFS V1745, V1943, V4173, V4215; "Portazuela Mt.", Constanza (not mapped), MCZ 57985; "Jimenoa Mts", ca. 4000 feet (not mapped), MCZ 57986; *San Juan Prov.*, 2.5 km W, 5.4 km S San Juan, ASFS V328; Río Arriba del Norte, 1950 feet, ASFS V524; *San Rafael Prov.*: 0.5 mi. N Pedro Santana, ASFS V331; 6 km WSW Hondo Valle, 2650 feet, ASFS V387.

VIII. REPÚBLICA DOMINICANA: *Puerto Plata Prov.*: Sosúa, MCZ 43659-61; Chocó, MCZ 13670; pass between Santiago and Puerto Plata, SMF 26334; *Espaillet Prov.*: 2 km SW José Contreras, 2000 feet, ASFS V1903; *María Trinidad Sánchez Prov.*: 6 km SE Nagua, ASFS V1863; *Distrito Nacional*: 4 km E Río Jaina, ASFS V2035.

IX. HAITI: *Département de l'Ouest*: Morne Calvaire, 1 mi. SW Pétienville, 2300 feet, ASFS X1288, X1715; Kenscoff, 5000 feet, ASFS X2255-58, MCZ 45744; Furcy, 5600 feet, ASFS X2341-50, X3335-39, MCZ 51418, 60123-30; Peneau, 5000 feet, ASFS X1569-71, X1720-22, X2033, X2036-42, X2082-85, DRP 2256; Rivière Froide, USNM 69434. REPÚBLICA DOMINICANA: *Barabona Prov.*: 10.5 mi. S Cabral, 3500 feet, ASFS V2913, DWB 291; 8 km SE Las Auyamas, 2600 feet, ASFS X9891-904, X9949, V282, V351-57, V525-27, V589, V1122-30, V2901-07, V3634-39, V4008-13, RT 751; 1.8 mi. N Las Auyamas, 3400 feet, ASFS V37; 2 km N Las Auyamas, ca. 2800 feet, ASFS V2918; 4 km SE Polo, 2000 feet, ASFS V2916-17.

*X. D. p. protenus* × *lincolni*: HAITI: *Dépt. de l'Ouest*: Bascap Rouge, 10 km NE Jacmel, MCZ 65210; between C-yes de Jacmel and Marigot, MCZ 56147; near Saltrou, UMMZ 123697-98, CM 38694-95; Trou Roche, near Saltrou (not mapped), MCZ 68580-83; Pavie Terre, near Saltrou (not mapped), MCZ 68584; Thiotte, near Saltrou, MCZ 69408-11

### *Dromicus parvifrons tortuganus* Dunn

TYPE LOCALITY: Haiti, Ile de la Tortue.

DIAGNOSIS: Zone one uniform black; lateral light stripe on rows 6-7 modally; zone two uniform black or bicolor with very wide dark upper stripe (Fig. 4); ventral and subcaudal scales high; size moderate (males to 370 mm, females to 487 mm).

DISTRIBUTION: Ile de la Tortue, Haiti (Fig. 9).

VARIATION: In all specimens zone one is uniform black (= gray in old specimens). The light lateral stripe occupies scale rows 6-7 in ten specimens, rows 5-6 in two. Zone two is unicolor dark in all specimens (anteriorly the bicolor condition of this zone is evident in all specimens). Throats are unspotted in all specimens and venters unpigmented in all but four specimens in which

very light spotting occurs. Spots occur along the ends of the anteriormost ventral scutes in four specimens. Ventral scales are 164 in the available male, 157-168 in the females; subcaudals 125 in the male and 129-139 in the females.

SPECIMENS EXAMINED:

HAITI: *Ile de la Tortue*: MCZ 37677-81; Palmiste, ASFS X2332-38.

*Dromicus parvifrons alleni* Dunn

TYPE LOCALITY: Haiti, Ile de la Gonâve.

DIAGNOSIS: A race of *D. parvifrons* characterized by generally dark coloration (zone one and upper part of zone two), bold wide light lateral stripes (Fig. 5), orange to yellow or reddish lower sides and venter, very high ventral and subcaudal scale counts, and large size (males to 452 mm, females to 530 mm).

DISTRIBUTION: Ile de la Gonâve and Petite Gonâve (Fig. 9), Haiti.

VARIATION: Zone one uniform black except for occasional individuals which have a few light-edged scales in this zone. Lateral light stripe (pale yellow in life) occupies scale rows 5-7 in all but three of the specimens examined; in two of these rows 6-7 are involved, and in one rows 5-6. Zone two is bicolor, the upper part consisting of a wide black stripe, the lower part "pale orange to buffy". Throats are generally unmarked, although a few have some spotting. Venters are clear in the majority of specimens; six specimens have a moderate amount of dark spotting and stippling. Ventral coloration in life is described as "pink to pale orange, deepest on throat, fading to yellow posteriorly and on tail". Iris color in life was "dark brown, golden red above". (Color notes taken in life by the junior author on the ASFS specimens examined). Ventral scales of males 157-168, females 157-161; subcaudals 138-151 in males, 133-140 in females.

SPECIMENS EXAMINED:

HAITI: *Ile de la Gonâve*: MCZ 12860 (paratype), 12861 (type), 25562, 25563, USNM 10170-71, 60608, 80830; Pointe à Raquette, MCZ 80286; Nan Palmiste, 4 km from Pointe à Raquette, MCZ 80279-85; Ti Roche, 0.5 km from Pointe à Raquette, MCZ 80287; Ti Palmiste, 6 km NE Pointe-à-Raquette; Anse à Galets, USNM 75928; Etroits, ASFS X2435-39, X2490, X3329-34, DRP 2404; Nan Café, MCZ 61035-37, USNM 76802. *Petite Gonâve*, AMNH 49744.

*Dromicus parvifrons rosamondae* Cochran

TYPE LOCALITY: Haiti, Ile-à-Vache.

DIAGNOSIS: A subspecies of *D. parvifrons* characterized by uniformly dark zones one and two, a narrow light dorsolateral stripe on rows 5-6 (Fig. 6),

a heavily pigmented venter, relatively small size (males to 382 mm, females to 412 mm), and moderately high ventral and subcaudal scales.

DISTRIBUTION: Ile-à-Vache (Fig. 9), Haiti.

VARIATION: All specimens possess a uniformly black zone one. The light lateral stripe occupies the sixth scale row in four specimens, the fifth and sixth scale row in four specimens, and the fifth scale row in one. The stripe is quite narrow in all cases; when it occupies more than one scale row, it is just the corners of the subsidiary row that are involved. In some specimens the stripe is very faint. Zone two is unicolor black (except anteriorly) in all but two specimens in which there is a lightening of the centers of the two lowermost scale rows on the anterior half of the body. The venters are heavily pigmented; most specimens have heavy spotting and mottling over the venter; in two the ventral pigmentation is a more even stippling. Throat spotting is not particularly heavy in most. The lateral ends of the ventral scales of all specimens possess spots extending far posteriorly (these eventually merge with the encroachment of the dorsal coloration onto the edges of the venter), and there are in three specimens two more medial rows of spots; generally the spotting is not so regular.

Ventral scales of two males are 150 and 151, of seven females 147-152; subcaudals 131 in the one male with a complete tail, 117-132 in three females.

SPECIMENS EXAMINED:

HAITI: *Ile-à-Vache*: MCZ 37668-72 (type and paratypes); western end, ASFS X3584-85, X3639-40.

*Dromicus parvifrons lincolni* Cochran

TYPE LOCALITY: República Dominicana, Isla Beata.

DIAGNOSIS: A subspecies of *D. parvifrons* characterized by a generally dark coloration (Fig. 7), high ventral and subcaudal counts, and large size (males to 514 mm, females to 388 mm).

DISTRIBUTION: Isla Beata, and the portion of the Barahona Peninsula to the south of the Sierra de Baoruco, República Dominicana (Fig. 9).

VARIATION: The type specimen is uniformly dark above except for traces of zonation on the neck. Another specimen from Beata (MCZ 29054) has the same uniform black coloration and undulating neck zonation of the type. A specimen from near Paraiso is uniform black with thin dorsolateral lines on scale rows 5-6. Of two specimens from near Oviedo, one (a large female) has indications of the light lateral line only on the anterior half of the body; zone one is dark, but many of the scales have light edges; zone two is indistinct from zone one over much of the body but its lower part is lighter (bluish gray). The other specimen has light stripes the length of the body; zone one is similarly

darkened but with light-edged scales; zone two has a narrow dark upper border and a wide lighter portion. A specimen from Pedernales is much lighter in color; zone one is uniform grayish; the dorsolateral lines are present but indistinct from the very light zone one which has only a very thin upper edge. This specimen also had a reddish coloration in life, and an undulating neck pattern. The venters and throats of all these specimens vary from unmarked to having a moderate amount of spotting and lateral encroachment. Ventral scales are 159 in the one male, 159-169 in the five females; subcaudals are 140 for the male and 133-140 for the females. A single juvenile male specimen with the only locality data as "Cabo Rojo" only doubtfully pertains to this subspecies. It has lower counts than any other *lincolni* (ventrals 150, caudals 134). Cabo Rojo is a not uncommon name in Spanish speaking countries, and is known to apply to at least two places in the Dominican Republic, one on the Barahona Peninsula and the other on the Samaná Peninsula.

SPECIMENS EXAMINED: REPÚBLICA DOMINICANA: *Isla Beata*, USNM 83890 (type), MCZ 29054; *Barahona Province*: Hermann's finca, near Paraíso, MCZ 43818; *Pedernales Province*: 5 mi. NE Oviedo, MCZ 57761; Pedernales, ASFS V2682; *Pedernales Province?*: Cabo Rojo, MCZ 56148 (*lincolni?*).

### *Dromicus parvifrons niger* Dunn

TYPE LOCALITY: The type and paratype of *niger* (MCZ 7833), collected by A. H. Verrill, supposedly came from La Vega in the República Dominicana. One of the specimens (the type, by its agreement with the counts given by Dunn) undoubtedly represents the true "*niger*" population on the Samaná Peninsula; the other, though darkened, has a *protenus*-like pattern. Four specimens from about 2 kilometers east of the town of La Vega are typically *protenus* in coloration (*vide supra*), and intergradient specimens with *protenus*-like patterns are found much farther to the east near the base of the Samaná Peninsula. Purely black specimens are known only from the Samaná Peninsula on the mainland. The type of *niger* (a female) also has ventral scale counts which fall within the range of Samaná females but not within the range of Cordillera Central or La Vega females. A. H. Verrill visited both La Vega and the Samaná during his collecting, the former for eight days, the latter region for well over a month (WETMORE and SWALES, 7: 17-18). It seems likely that the two specimens of *Dromicus* were incorrectly recorded as coming from the same locality. As the type is a black snake that agrees most closely with specimens from the Samaná Peninsula and not with specimens from the La Vega region, we believe it is appropriate to restrict the type locality of *niger* to the Samaná Peninsula. Verrill spent time both in the vicinity of the town of Sánchez at the base of the peninsula and at the town of Samaná near the tip. Because intergradient specimens may be found at the base of the peninsula (*vide infra*), we restrict the type locality of *Dromicus p. niger* to the town of Samaná, Samaná Province, República Dominicana.

DIAGNOSIS: A uniformly black (dorsally) subspecies of *Dromicus parvifrons* with a low ventral scale count; size moderate (males to 415 mm, females to 452 mm).

DISTRIBUTION: The Samaná Peninsula of the República Dominicana (Fig. 9).

VARIATION: Zonation is absent. The majority of specimens are uniform black above; occasional specimens have a few light scale edges on the scales of the lower sides, and there is frequently a bluish area on the sides of the neck with intermingled darker mottlings. In keeping with the ontogenetic color change noted for this species, juveniles not infrequently show some pattern which may faintly resemble the zonate *protenus* pattern or involve numerous light-edged scales. Large specimens with the only data given as "Samaná Province" (AMNH 40248, 40253, 43827-28) also have light scales over the body, although with no indication of zonation. Samaná Province extends beyond the Samaná Peninsula around the bight of Samaná Bay nearly to the Bahía de San Lorenzo. The mainland adjacent to the Samaná Peninsula and along the southwest corner of the Bahía de San Lorenzo is an area of intergradation between *niger* and *protenus*. It is likely that these specimens came from the western or southern portions of Samaná Province. Venters may be uniform black (except for the neck region) or show varying degrees of light and black mixture. The modal condition is a nearly entirely black venter; no specimens of *niger* were observed to have entirely light venters. In some specimens virtually the entire venter is black but posteriorly and on the undersurface of the tail the color lightens; when the venter is black, the tail is concolor with it, however. Throats are always light in ground color, with light to heavy spotting.

Ventral scales range from 147 to 158 for males, 145 to 154 for females. Subcaudals are 129-141 for males, 118 to 130 for females.

#### SPECIMENS EXAMINED:

REPÚBLICA DOMINICANA: *Samaná Province*: AMNH 27735-38, 40386, 40247-53, 43827-28; Sánchez, USNM 72638-39; 6 km E Sánchez, ASFS V1911, V2020; Samaná, MCZ 43692-95, AMNH 40140; Laguna, AMNH 40138, USNM 63600-01, 66717-24; Rojo Cabo, AMNH 40134; near foot of Loma de Traverso, USNM 66725; Río San Juan, USNM 74954-58; Samaná Peninsula, USNM 66774-84. *La Vega Province*: La Vega (?): MCZ 7833 (type).

The eastern extremity of Hispaniola to the east of the city of Santo Domingo supports another melanistic population of *Dromicus*, which is here named

#### *Dromicus parvifrons paraniger*, new subspecies

HOLOTYPE: MCZ 77227, an adult female, collected 17 km E of Boca Chica, San Pedro de Macorís Province, República Dominicana, 21 July 1964, by Richard Thomas. Original number V3077.

PARATYPES: REPÚBLICA DOMINICANA: *Distrito Nacional*: ASFS X7767, 16.7 mi. (26.4 km) E Santo Domingo, 14 June 1963, R. Thomas; ASFS V684-86, Boca Chica, eastern edge, 23 August 1963, R. Thomas; *La Romana Province*: ASFS V1120, 1 mi. NE Boca Chavón, 4 September 1963, R. Thomas; ASFS V875-76, RT 799, 0.5 mi. NE Boca de Yuma, 30 August 1963, Albert Schwartz, R. Thomas.

ASSOCIATED SPECIMENS: REPÚBLICA DOMINICANA: *La Romana Province*, La Romana, MCZ 16434-35; *El Seibo Province*: USNM 65787, Jovero; USNM 65788, Lialí.

*Dromicus p. paraniger* × *protenus* (see also discussion of *protenus*): REPÚBLICA DOMINICANA: *Distrito Nacional*: MCZ 57760, 79252-56, SMF 26316, Santo Domingo. *El Seibo Province*: ASFS X7876, 3.5 mi. S. Sabana de la Mar; MCZ 57762, ASFS V3126-27, Sabana de la Mar; *San Cristóbal Province*: ASFS V3128, 10 km NE Gonzalo, 600 feet.

DIAGNOSIS: A melanistic race of *D. parvifrons* characterized by lack of or very faint zonation, light edges to many of the dorsal scales, typically a lighter venter than *D. p. niger* (Fig. 8), moderately low ventral and subcaudal scale counts, and moderate size (males to 390 mm, females to 420 mm).

DISTRIBUTION: The southeastern part of the Republica Dominicana to the east of the bight of the Bahía de Samaná on the north and the city of Santo Domingo on the south (Río Ozama) (Fig. 9).

DESCRIPTION OF TYPE: An adult female, snout-vent length 400 mm, tail 250 mm. Upper labials 8/9, lower labials 10/10, loreals 1/1, preoculars 1/1, postoculars 2/2, temporals 1+2/1+1. Ventral scales 152, subcaudals 110, total underbody scales 262; scale rows 19-19-17.

COLORATION: Dorsal ground color black, head grayish; a pair of buffy stripes along each canthus along the outer edges of the supraocular and onto the upper temporal region where they fade out on a level with the angle of the jaw. Lower side of neck and anterior fourth of body bluish with scattered black spots and mottling. Zonation not apparent on body. Light edges to dorsal scales form a pattern of vague dark bars on anterior fifth of body; there merge with black dorsal coloration, along upper sides of neck. Ligth-edged scales uniformly distributed over anterior half of body, fading out on posterior half, the posterior third being almost entirely black. Upper labials white with dark pigment following sutures to labial border. Venter cream (in preservative) on underside of head and neck, fading to bluish-gray, becoming darker (nearly black), about midbody (light centers to ventral scales occur the length of the body); throat and anterior body spotted and mottled with black, which becomes gradually more uniformly distributed forming at about midbody. Underside of tail dark basally, becoming lighter on posterior half.

**VARIATION:** The largest specimen is a female 420 mm snout-vent length. Scalation of the paratypes is generally the same as that of the type; the upper labials are typically 8/8 with only variants of 9 unilaterally; lower labials are typically 10/10 with variants of 9 (unilaterally) or 11 (unilaterally or bilaterally); loreals, preoculars, and postoculars as in the type; temporals typically 1+2/1+2 with variants of 1+1 unilaterally or bilaterally. Scale rows are uniformly 19-19-17. Ventral scales of males range from 149 to 163, females 147 to 156; total ventrals 273-281 for males, females 271-284; subcaudals 127 in the only male with a complete tail, females 110 to 129. In coloration the paratypes are similar to the type; zonation is very weak at best but, when evident, is seen as a faint dorsolateral stripe. The barred pattern on the neck is present to greater or lesser degree in all paratypes, some specimens having a series of nearly disconnected spots instead. The ontogenesis of this pattern is seen in a young specimen (MCZ 16434) in which the dark upper edge of zone two (postocular stripe) is constricted at intervals along the neck. The light scale edges noted for the type are characteristic, but are more extensive in some specimens than others. The modal ventral coloration is lighter than that of the type; but most specimens have considerable encroachment of dorsal coloration and spotting, although one has a nearly uniformly light venter. The ventral ground color is frequently yellow or pinkish. Throat spotting is light to heavy. Specimens from Sabana de la Mar and the *haitises* region to the west are considered intergradient with *protenus*. Although not so evident in the preserved specimens which have lost their scale coverings, in life these snakes were prominently (although darkly) zonate with brown to gray ground colors, not black as in typical *paraniger*. The same statement applies to the series from Santo Domingo is normally colored and zonate like a *protenus*, and is decidedly lighter than comparable specimens of *paraniger* (these appear entirely black in the field). Thus Santo Domingo is regarded as being in an area of intergradation between *protenus* and *paraniger*.

On a recent trip to the island of Saona the senior author obtained three specimens of an extremely black *Dromicus*, which is distinct from the other members of the species, and is given the name.

*Dromicus parvifrons stygius*, new subspecies

**HOLOTYPE:** MCZ 77228, an adult female, collected on Isla Saona, the environs of Mano Juan, 19 July 1964, by Richard Thomas.

**PARATYPES:** ASFS V3072-73, same locality as type, by natives and R. Thomas.

**DIAGNOSIS:** An almost uniformly black subspecies of *D. parvifrons*, further characterized by a bright blue neck, moderate or possibly large size (largest specimen 486 mm), and high ventral and subcaudal counts.

DISTRIBUTION: The island of Saona; known only from the type locality (Fig. 9).

DESCRIPTION OF TYPE: An adult female, 486 mm snout vent, tail 316 mm. Upper labials 8/8, lower labials 10/10, loreals 1/1, preoculars 1/1, postoculars 2/2, temporals 1+2/1+2. Ventrals 167, subcaudals 133; total underbody scales 300. COLORATION: With the exception of the lower scale rows on the neck which are bright blue, entire dorsal coloration shiny black, no light edges to scales or evidences of zonation. Upper labials light with pigment following sutures to labial border. Entire venter black, with the exception of the anterior seventh of the body and including the underside of the tail. Antermost ventrals and throat white, stippled blue (see "Variation" below) and with black spots and marbling.

VARIATION: In head scalation the two paratypes (both females) are identical to the type. Ventral scales are 164 and 167, subcaudals 132 for the one with a complete tail; total underbody scales 296 for the one with a complete tail. Color notes in life on the type series are: "Dorsal coloration uniform black; upper and lower labials white stippled blue. Chin and throat scales plus anterior ventrals white with varying amounts of blue stippling and heavy black spotting. Blue coloration (MAERZ and PAUL, 3, Pl. 35K5) on side of head and lowermost two scale rows on neck. Ventrals bluish to blue-black (anterior to posterior), underside of tail blue-black."

Another specimen of this race which had been killed was observed by the senior author on Saona; this was a very large specimen and had the characteristic uniform black coloration. In life *stygius* is an extremely beautiful snake, especially freshly captured specimens which flatten their necks showing the bright blue coloration along the edges of the "hood".

## COMPARISONS AND DISCUSSION

The entirely mainland patterned races (*parvifrons* and *protenus*) are distinguished from one another by the lower ventral scale counts of the former (see Fig. 10) as well as its lighter coloration. The satellite island patterned races, *tortuganus*, *alleni*, *rosamondae* and *lincolni* (the last is of course not restricted to the island of Beata but is found on the adjacent mainland) are characterized as a group by a uniformly dark zone one, which, along with different characters of each race, distinguish them from *parvifrons* and *protenus*. The pertinent comparisons of the satellite islands race are with one another. *Alleni* is characterized by its high ventral and subcaudal counts, very bold pattern (prominent dorso-lateral light stripes and sharply contrasting upper and lower halves of zone two) and large size (it is the largest race); *tortuganus* by its narrower, less prominent dorsolateral stripes, high scale counts and relatively unpigmented venter; *rosamondae* by a generally dark coloration (weak lateral stripes), heavily pigmented venter, and low ventral and caudal counts; and *lincolni* by a generally dark dorsal coloration, frequently an undulating dark stripe (upper half of zone two)



on the neck, and high ventral and caudal counts. The easternmost races, *niger*, *paraniger*, and *stygius* differ from all others by their high degree of melanism. *Niger* is uniformly black dorsally and has low ventral and subcaudal counts; *paraniger* shows remnants of the zonate pattern, and (or) has light edges to the dorsal scales, and low ventral and subcaudal counts; *stygius* is uniformly black except for the throat and neck region which is bright blue (*niger* may also have bluish necks) and has very high ventral and subcaudal counts.

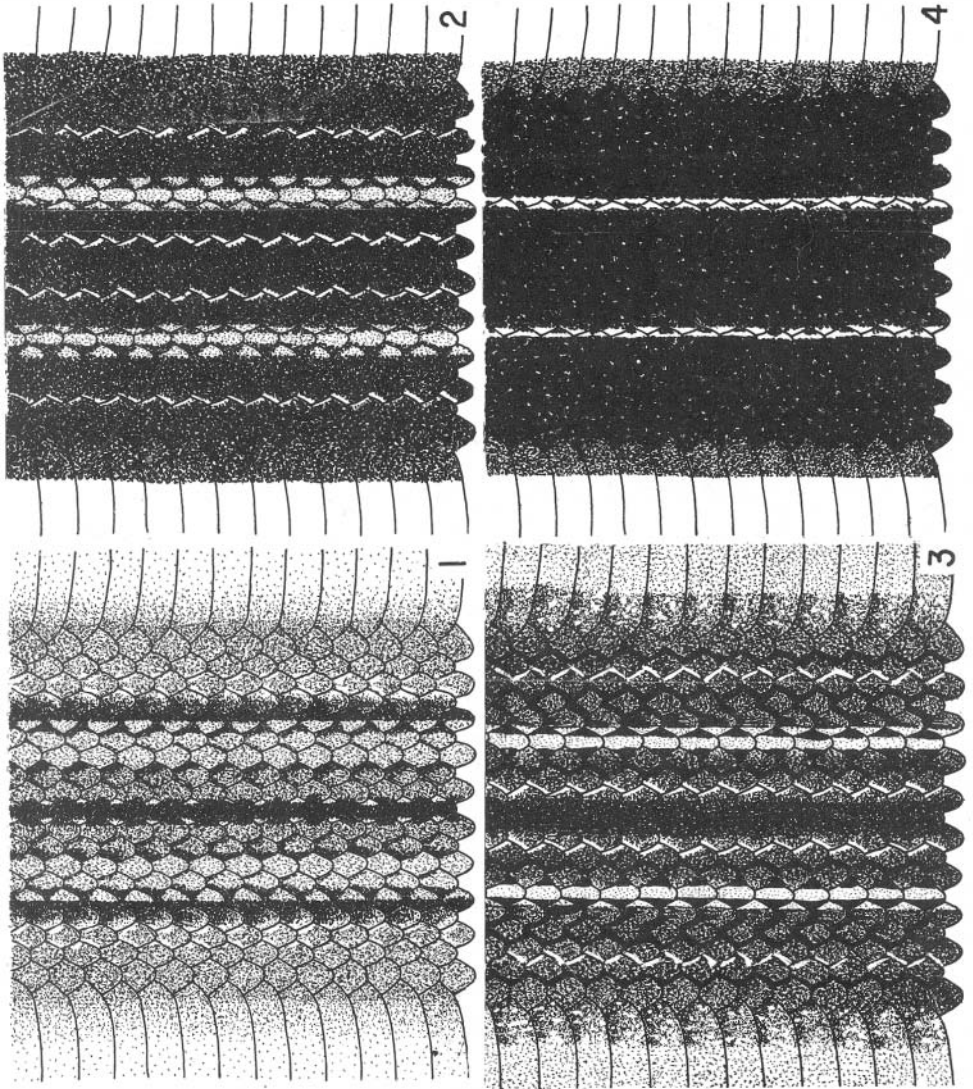
The similarity of the insular races, especially the western ones, to one another (dark coloration, simplified pattern, high scale counts) presents an interesting puzzle. Mere fortuity is not satisfying as an answer; adaptation to some common environmental factor found on offshore islands is another possibility (there is some community of ecological similarity; for example, the islands are typically xeric), which also is unsatisfying, perhaps mostly due to lack of precise ecological data.

Yet another possibility is that these satellite races are similar to one another because they are more primitive, because of an evolutionary inertia in their isolation from the main island. A possible support of this suggestion is the presence of three specimens with very high ventral counts from the Cul de Sac (Valle de Neiba) near Duvergé. Two other forms, *Diploglossus curtissi* and *Amphisbaena gonavensis* (SCHWARTZ, 5; THOMAS, 6), have been shown to have a distribution or an inferred distribution which includes Gonâve, the Cul de Sac, and the low areas of the Barahona Peninsula. So the question occurs whether *lincolni* and *alleni* may not be or have been at one time so connected.

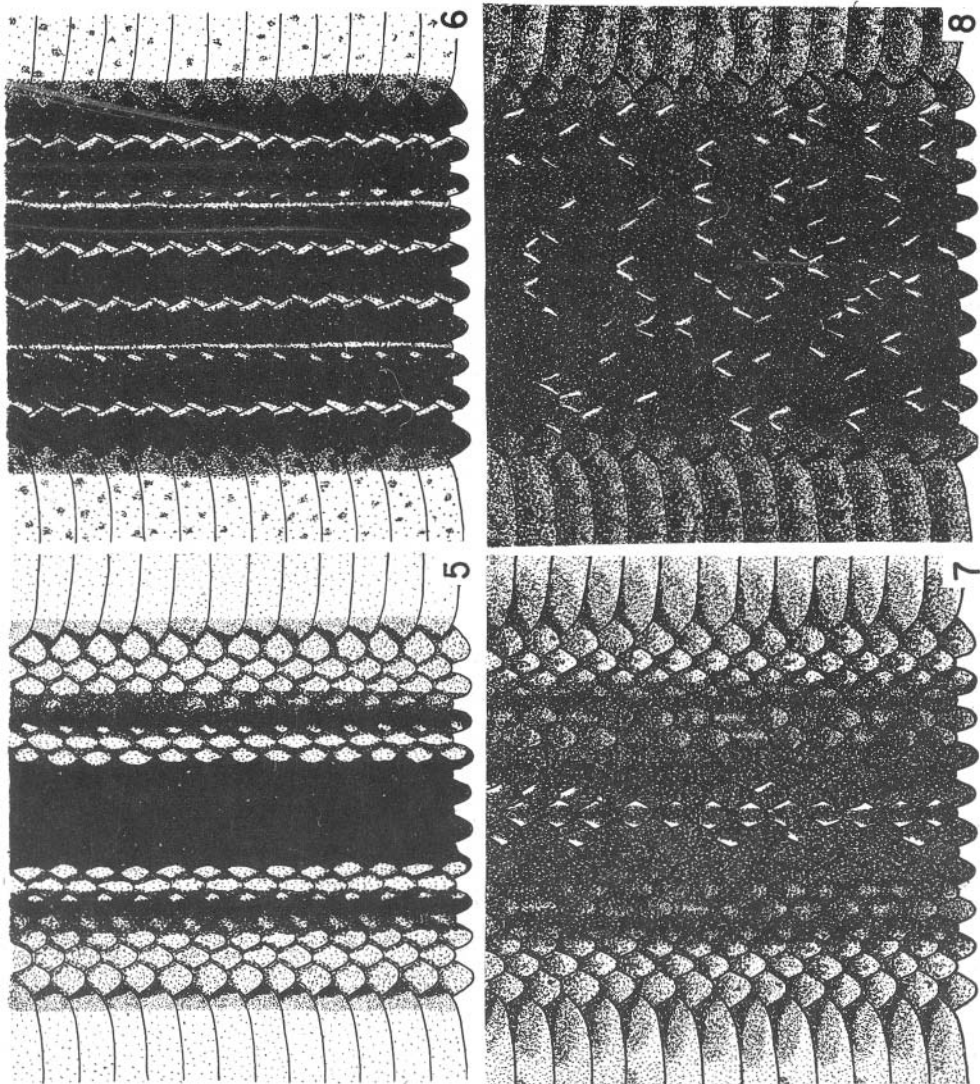
### LITERATURE CITED

1. COCHRAN, DORIS M.  
1941. The herpetology of Hispaniola. *Bull. U. S. Natl. Mus.*, 177: i-vii, 1-298, 120 figs., 12 pls.
2. DOWLING, H. G.  
1951. A proposed standard system of counting ventrals in snakes. *Brit. J. Herpetol.*, 1(5): 97-99.
3. MAERZ, A., & M. REA PAUL  
1950. *A dictionary of color*. McGraw-Hill Book Co., Inc., pp. v-vii, 1-23, 137-208, 56 plates.
4. MERTENS, R.  
1939. Herpetologische Ergebnisse einer Reise nach der Insel Hispaniola, Westindien. *Abb. senckenberg. naturf. Ges.*, 449: 1-84, 10 pl.
5. SCHWARTZ, A.  
1964 *Diploglossus costatus* Cope (Sauria, Anguillidae) and its relatives in Hispaniola. *Reading Public Mus. and Art Gallery, Sci. Publ.*, 13: 1-57.
6. THOMAS, R.  
1964. Two new subspecies of *Amphisbaena* (*Amphisbaena*, Reptilia) from the Barahona Peninsula of Hispaniola. *Breviora*, 215: 1-4.
7. WETMORE, A. & B. H. SWALES  
1931. The birds of Haiti and the Dominican Republic. *Bull. U. S. Natl. Mus.*, 155: iv + 483 pp., 26 pls.

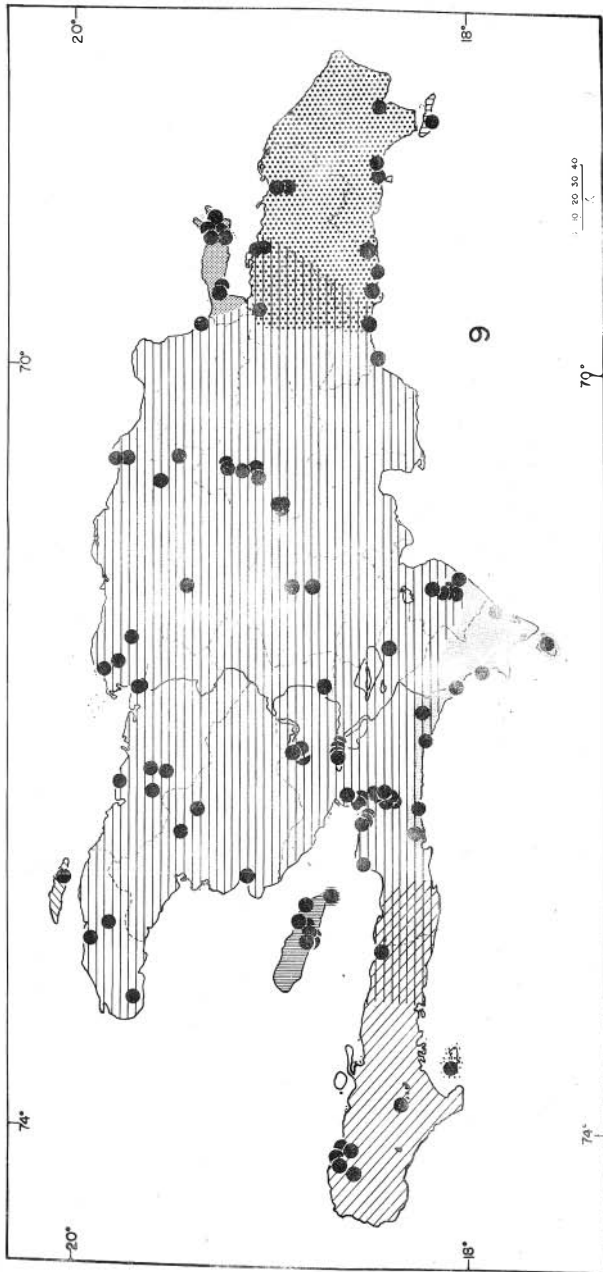
- Fig. 1. *Dromicus parvifrons parvifrons*, pattern at midbody, ASFS X3026, Camp Perrin, Dépt. du Sud, Haiti.
- Figs. 2-3. *Dromicus parvifrons protenus*, pattern at midbody; fig. 2, ASFS X2346, Furcy, 5600 feet, Dépt. de l'Ouest, Haiti; fig. 3, ASFS V4271, 12 km NE Jarabacoa, La Vega Prov., República Dominicana.
- Fig. 4. *Dromicus parvifrons tortuganus*, pattern at midbody, ASFS X2332, Palmiste, Ile de la Tortue.



- Fig. 5. *Dromicus parvifrons alleni*, pattern at midbody, ASFS X3330, Etroits, Ile de la Gonâve.
- Fig. 6. *Dromicus parvifrons rosamondae*, pattern at midbody, ASFS X3640, western end., Ile-à-Vache.
- Fig. 7. *Dromicus parvifrons lincolni*, pattern at midbody, ASFS V281, 5 mi. NE Oviedo, Pedernales Prov., República Dominicana.
- Fig. 8. *Dromicus parvifrons paraniger*, pattern at midbody, MCZ 77227, holotype, 17 km E Boca Chica, San Pedro de Macorís Prov., República Dominicana.



- Fig. 9. Hispaniola, showing the distribution of the subspecies of the races of *D. parvifrons*, as follows: *parvifrons*, wide diagonal lines; *protenus*, wide horizontal lines; *paraniger*, coarse stippling; *niger*, medium stippling; *lincolni*, fine stippling; *alleni*, fine vertical lines; *tortuganus*, medium diagonal lines; *stygicus*, medium vertical lines; *rosamondae*, open stippling. Overlap of symbols indicates areas of intergradation.



- Fig. 10. Ventrals of males and females of subspecies of *D. parvifrons*: horizontal line indicates range, vertical line indicates mean, low rectangle shows one standard deviation and high rectangle two standard errors of the mean on each side of mean. Number of specimens shown as figure at left end of line. Samples coded as follows: 1) *parvifrons*, 2) *protenus*, 3) *niger*, 4) *paraniger*, 5) *stygius*, 6) *lincolni*, 7) *rosamondae*, 8) *alleni*, 9) *tortuganus*. Data from intergradient samples from Miragoâne (*parvifrons* × *protenus*), Saltrou (*protenus* × *lincolni*), and intergrades between *protenus* and *paraniger* not included.



